CITYTUTOR

Seventh Grade Math Lesson Materials

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Identification of the copyrighted work claimed to have been infringed, or, if multiple copyrighted works allegedly have been infringed, then a representative list of such copyrighted works;

Identification of the material that is claimed to be infringing and that is to be removed or access to which is to be disabled, and information reasonably sufficient to permit us to locate the allegedly infringing material, e.g., the specific web page address on the Platform;

Information reasonably sufficient to permit us to contact the party alleging infringement, including an email address;

A statement that the party alleging infringement has a good-faith belief that use of the copyrighted work in the manner complained of is not authorized by the copyright owner or its agent, or is not otherwise permitted under the law; and

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CITYTUTOR DC

G7 Unit 3:

Proportional Relationships and Percentages

G7 U3 Lesson 1

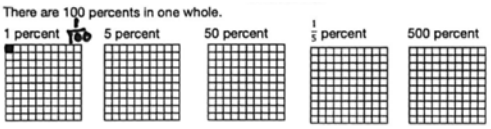
Calculate the percentage of a rectangular area that is covered by another region, and explain why the percentage is the same in scaled copies of the same figure.

G7 U3 Lesson 1 - Today we will convert between a fraction, decimal and percent then draw a picture.

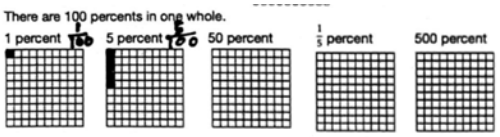
Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we will convert between a fraction, decimal and percent then draw a picture. This is some review from 6th grade that will let us solve 7th grade percent problems in future lessons.

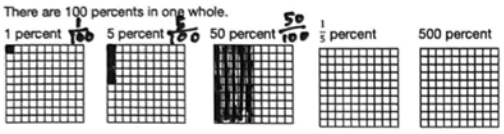
Let's Review (Slide 3): Percent means out of 100. Per means "for every" or "out of." Cent should make you think of money. This says, "We've heard of cents when we are talking about 100 pennies in a dollar." This is like 100 cents in a dollar. *Point to the 100 pretend pennies and the dollar.* Just like there 100 cents in a dollar, there are 100 percents in one whole. And it can be one whole anything. On a test, you can get up to 100 percent of the whole test. On a sale, you can pay up to 100 percent of the whole price. At the bottom of this slide, we have hundreds grids. *Point to a square.* This square has 100 little squares in it. So, let's shade the percents we see.



1 percent just means 1 out of 100. It can help to write that out as a fraction since that's what I'm saying with words. To shade it, I just color in one little square. This a percent. Like 1 cent in a dollar.

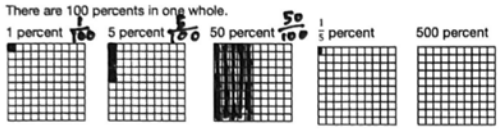


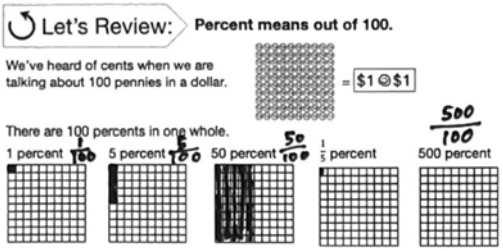
5 percent is just as easy. This means 5 out of 100. I am going to write that as a fraction. Now I shade 5 little squares out of the 100 squares in the whole.



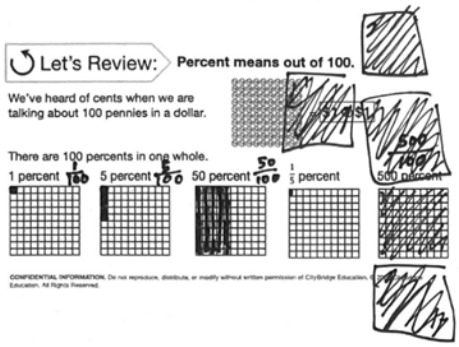
50 percent is just as easy. This means 50 out of 100. I am going to write that as a fraction. Now, I could count this as 1, 2, 3, 4 and on… But I can see this is a row of ten so I am just going to shade 10, 20, 30, 40, 50. That's 50 little squares out of 100 squares in the whole. That's 50%

Now these are a little challenging but as long as you slow down and switch out the word "percent" for "out of 100" in your mind, you will figure this out. 1 fifth means 1 out of 5. So this is 1 out of 5 out of the 100. That's like 1 fifth of something that was already in 100 pieces. That's 1 fifth of 1 square. We're going to turn fractions into percents in a few more slides. The thing I want you to see here is 1 fifth is not the same as 1 fifth percent. 1 fifth means I cut a whole into 5 pieces and shade 1. 1 fifth percent means I cut 1 whole into 100 pieces and share 1 fifth of the little pieces.



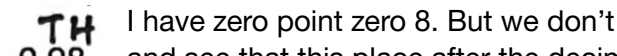


This is another one that is really challenging because 500 has the word "hundred" in it so people don't think they have to say "out of 100" for the percent as well. But they do. This is 5 hundred out of a 100. I can write that as a fraction.



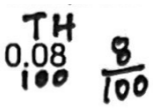
100 out of 100 would be the whole thing. So 500 out of 100 would be this whole 100 and then another whole hundred then another and another and another. I actually can't even fit the drawing on this slide because it would be so big. *You will want to start drawing another whole big square then another but this won't fit on your slide and that is okay. Just explain why it won't fit.* Great job. So now we know how to draw what percents look like. Let's think about fractions and decimals.

Let's Talk (Slide 4): When we think about turning decimals into percents, we use place value. I bet you can figure out what place value we use. Help me fill in the blanks here. Since percent means OUT OF 100, we look in the HUNDREDTHS place. Let's try it.



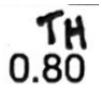
I have zero point zero 8. But we don't really read it that way. We can use a place value chart and see that this place after the decimal is the tenths and this next place is the hundredths.

Another trick that I use is to put a 1 under the decimal point and then put two zeros right under the digits. Now I can see what it is out of 100.

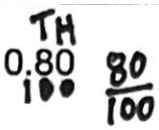


This is 8 out of 100. Let me write that as a fraction. Now I am going to write that as a percent.

We can shade this easily just like on the last slide. 8 out of 100 is 8 little squares out of the total 100 squares. It's 8 percent.

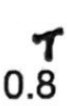


Let's do the next one. If I use a place value chart, I have tenths then hundredths. This is 80 hundredths. I am going to write that as a fraction - 80 over 100.

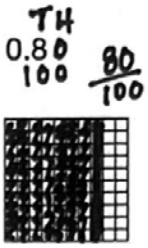


Let's use the 1 under the decimal trick. I write 1 then zero under the 8 and zero under the zero. I can see the 80 over 100 right in front of me. Now we know we need to shade 80 little squares. I will do it in tens - 10, 20, 30, 40, 50, 60, 70 and 80. It's 80 percent.

Are 0.08 and 0.8 the same? No! One was 8 hundredths and the other was 80 hundredths. The 8 is in a different place from the decimals so it it has a different value. Kind of like pennies and dimes. 0.08 is 8 pennies and 0.80 is 8 dimes.



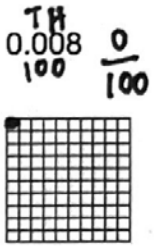
Let's do the next one. If I use a place value chart, this is only tenths. We don't want tenths, do we? We want hundredths because percent means out of 100. I am going to add a zero so now it's 80 hundredths.



Let's use the 1 under the decimal trick. I put one zero under the 8. That's not out of 100 so I put another zero. This is 80 hundredths or 80 out of 100. Let's write that fraction down. And now we know we need to shade 80 little squares. I will do it in tens - 10, 20, 30, 40, 50, 60, 70 and 80. It's 80 percent.

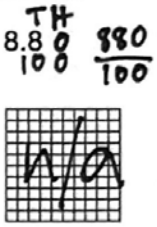
If you look at the ones we've done so far, 0.8 is the same as the one we just did, 0.80. That's because the 8 is right next to the decimal for both. But they are NOT the same as 0.08 where the zero pushes the 8 into a different place values. That reminds us that we don't change the value by adding zeros on this side. It is just an equivalent form.

Let's do zero point zero zero eight. Of course we don't really read a decimal that way. We use a place value chart. I have tenths, hundredths and thousands. Should I just assume this is 8 since I see an 8? NO! We are doing percents and percent means out of 100. So I still need to look for just hundredths and not let this trick me.



This is where the 1 under the decimal trick is super handy. I will write one, zero, zero and then I'm going to stop. I just want this out of 100. And look, it's ZERO out of 100. Then we just have these little pieces even smaller than hundredths. I will put the decimal there to show it's 00.8%. When I shade this, I am NOT going to shade the whole square. I am going to shade 8 tenths of square.

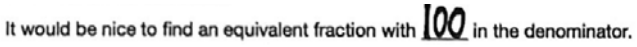
Last one! It is eight point eighth. Or if we use a place value chart, it is 8 and 8 tenths. If I look in the hundredths place, I need to annex a zero. It is 880 hundredths. I am starting to see this is more than 80 hundredths. It is 8 whole then the 80 hundredths.

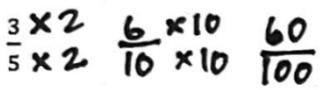


If I put the 1 under the decimal and then put 2 zeros, I still see, it is a big number of wholes, 8, plus 80 hundredths. This is another one that I can't really draw because I would need to draw 8 whole boxes. I am just going to let this one go. But we know it is big. It would be 100 - 200 - 300 - 400 - 500 - 600 - 700 - 800 then another 80! It is 880%.

That was great practice. Let's just review the big idea for this slide: If we want to change a decimal to a percent… *Read the top line.* "Since percent means out of one hundred, we look in the hundredths place."

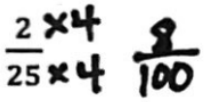
Let's Think (Slide 5): Now let's work on fractions. When we think about turning a fraction to a percent, we think about equivalent forms. It would be nice to find an equivalent fraction with 100 in the denominator.



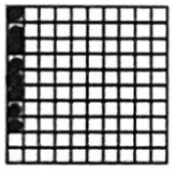


Let's think about 3 fifths. I can do "times 2" on the top and "times 2" on the bottom. Then I get 6 tenths. Now it is more obvious how to get to 100. I am going to do "times 10" on the top and "times 10" on the bottom. This is 60 hundredths.

That's the same as 0.60 with 60 in the hundredths place or 60%. I just shade 60 little squares.



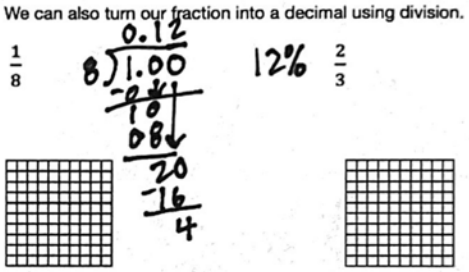
Let's think about 2 twenty-fifths. I know that 4 twenty-fives make 100 so I am going to do "times 4" on the top and "times 4" on the bottom. That makes 8 hundredths. That's 8 in the hundredths place of a decimal, which is zero point zero eight. Or 8 percent.

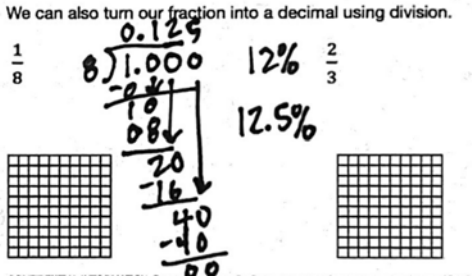


I shade 8 little squares.

Now, this won't work every time. These fractions have friendly numbers that are easy to turn into 100. There is one way to turn fractions into decimals that will work every time. We'll explore that on the next slide.

Let's Think (Slide 6): We still have this one main idea. When we think about turning fractions into percents, we think about equivalent forms. If it isn't easy to find equivalent fractions, we can use equivalent decimals. It isn't easy to look at 1 eighth and figure out how to multiply it to make 100. We could get close but there isn't anything times 8 to make 10 or 100. But we can also turn our fraction into a decimal using division. The top goes in the division symbol. 8 doesn't go into 1 so I put a 0. I am going to add a decimal and put two zeros so that gets me to the hundredths place. 8 goes into 10 one time. I subtract 8 and get 2. Pull down the 0. 8 goes into 20 two times. I subtract 16 and get 4. This is my percent: 12%.

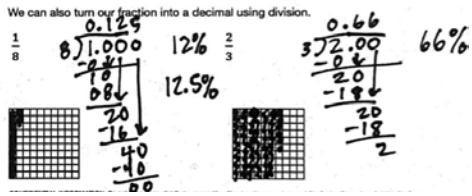




But let's see happens if we keep dividing. I will put another zero. I pull it down and now 8 goes into 40 five times. Subtract 40 and get zero. I could think of this as 12.5% if I wanted to. Once I get into the thousandths and ten thousandths, our pieces are getting so small that they are insignificant.

We shade the 12 squares. If we want we can shade 5 tenths of another square.

Let's do one more. It isn't easy to look at 2 thirds and figure out how to multiply it to make 100. We could get close but there isn't anything times 3 to make 10 or 100. But we can also turn our fraction into a decimal using division. The top goes in the division symbol. 3 doesn't go into 1. So I put a 0. I



am going to add a decimal and put two zeros so that gets me to the hundredths place. 3 goes into 20 six times. I subtract 18 and get 2. I pull down the zero. 3 goes into 20 six times. I subtract 18 and get 2. We can see where this is going. It's going to repeat on and on. But I have what I need to get a percent, right? It is 66 hundredths so I will shade 66 little squares.

Let's Try It (Slide 7): Now we will practice converting between all these forms together. I will lead you through step by step.

WARM WELCOME

Today we will convert between a fraction, decimal and percent then draw a picture..

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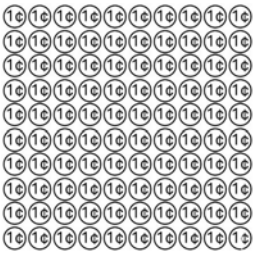
Let's Review:

Percent means out of 100.

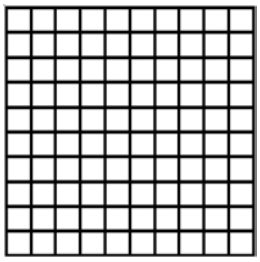
We've heard of cents when we are talking about 100 pennies in a dollar.



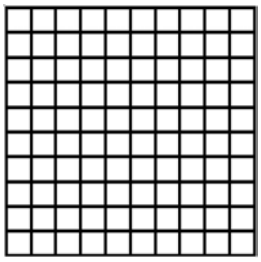
= $1 ☺ $1

There are 100 percents in one whole.

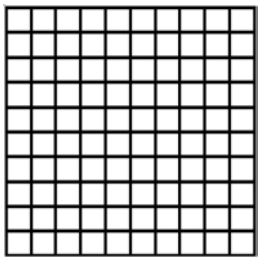
1 percent



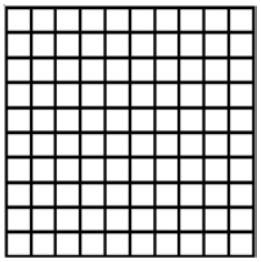
5 percent



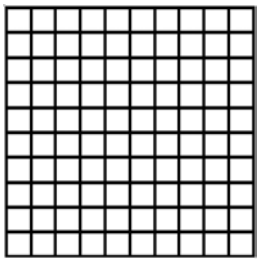
50 percent



$\frac{1}{5}$ percent



500 percent

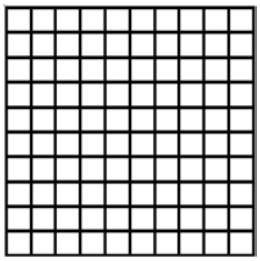


Let's Talk:

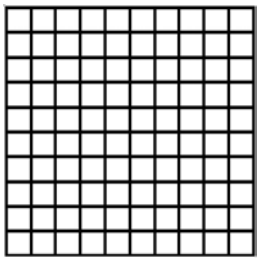
When we think about turning decimals into percents, we use the place value.

Since percent means _____, we look in the _____ place.

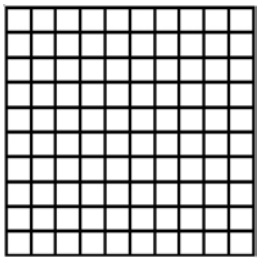
0.08



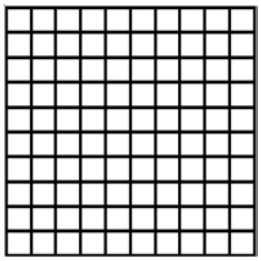
0.80



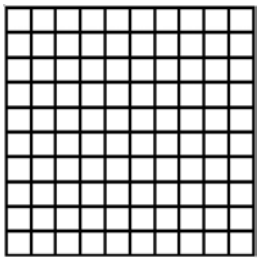
0.8



0.008



8.8

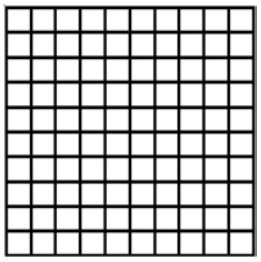


Let's Think:

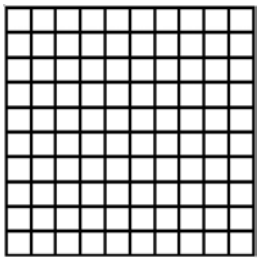
When we think about turning fractions into percents, we think about equivalent forms.

It would be nice to find an equivalent fraction with _____ in the denominator.

$\frac{3}{5}$



$\frac{2}{25}$

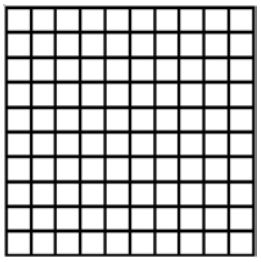


Let's Think:

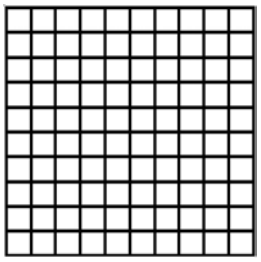
When we think about turning fractions into percents, we think about equivalent forms.

We can also turn our fraction into a decimal using division.

$\frac{1}{8}$



$\frac{2}{3}$

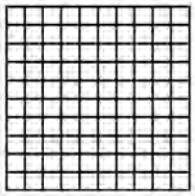
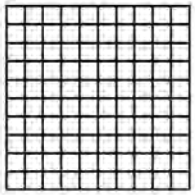
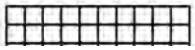


Let's Try It:

We will do it together step by step.

Name: _____ G7 U3 Lesson 1 - Let's Try It

Complete each row to show equivalent fraction, decimal and percent forms. Then shade the picture. Show any scratch work in the space provided.

Fraction	Decimal	Percent	Picture	Work shown:
$\frac{1}{5}$				
	0.345			
		6%		

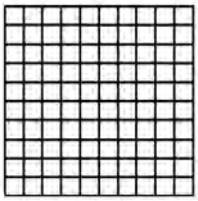
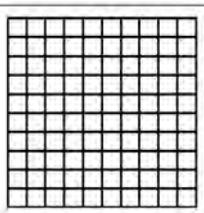
On your Own:

Now it's time for you to do it on your own.

Name: _____ G7 U2 Lesson 13 - Independent Work

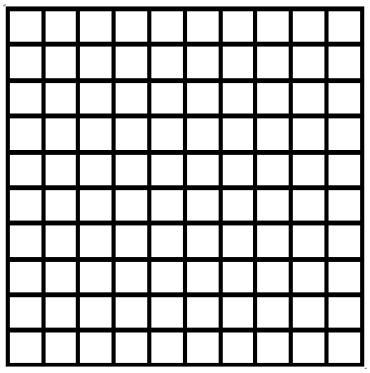
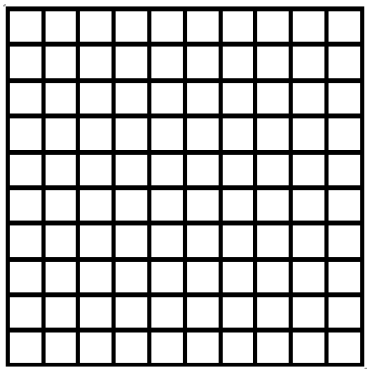
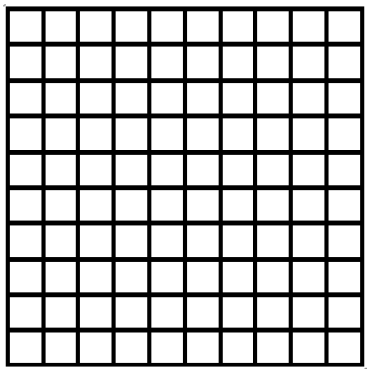
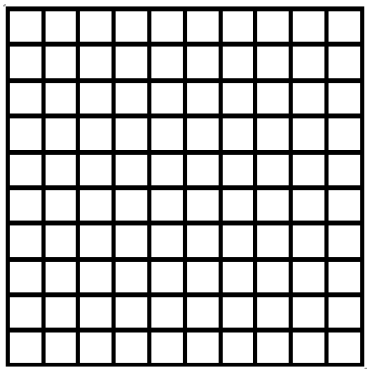
Remember: Percent means out of 100.

Complete each row to show equivalent fraction, decimal and percent forms. Then shade the picture. Show any scratch work in the space provided.

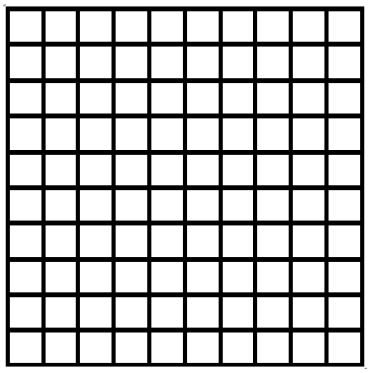
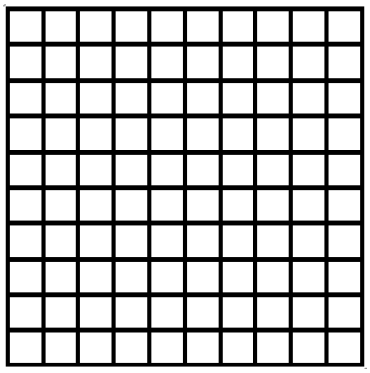
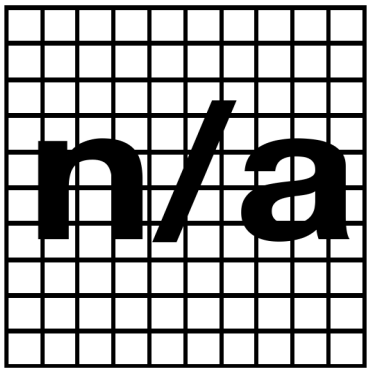
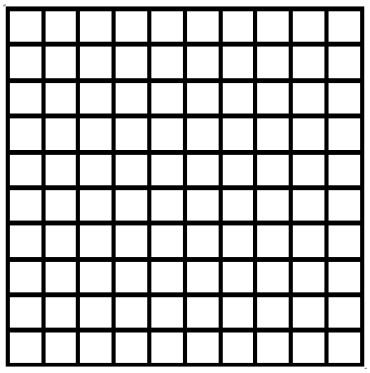
Fraction	Decimal	Percent	Picture	Work shown:
$\frac{1}{2}$				
	0.565			

Name: _____ G7 U3 Lesson 1 - Let's Try It

Complete each row to show equivalent fraction, decimal and percent forms. Then shade the picture. Show any scratch work in the space provided.

Fraction	Decimal	Percent	Picture	Work shown:
$\frac{1}{5}$				
	0.345			
		6%		
		60%		

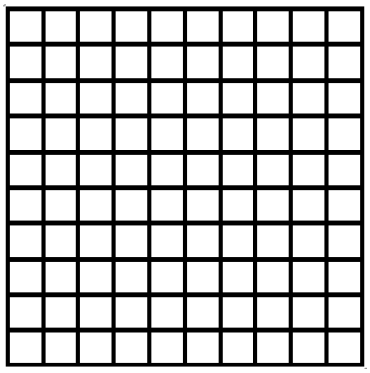
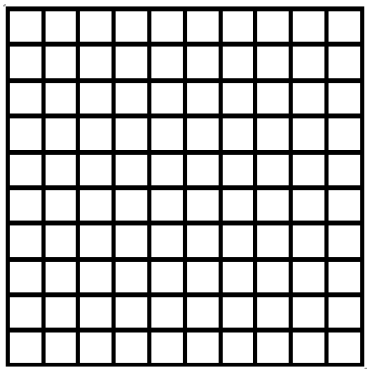
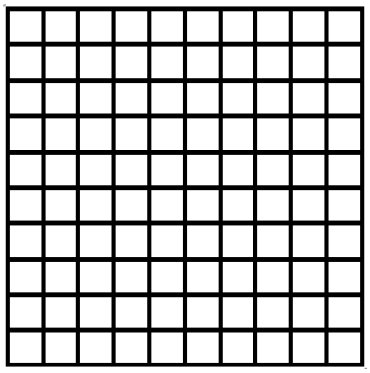
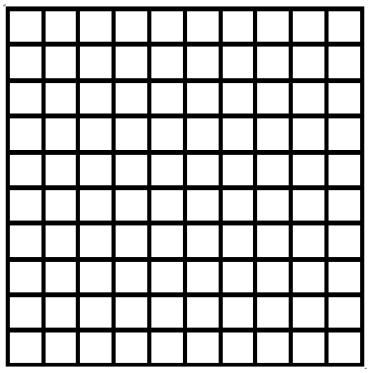
Complete each row to show equivalent fraction, decimal and percent forms. Then shade the picture. Show any scratch work in the space provided.

Fraction	Decimal	Percent	Picture	Work shown:
$\frac{4}{9}$				
	0.2			
		500%		
		$\frac{3}{4}$%		

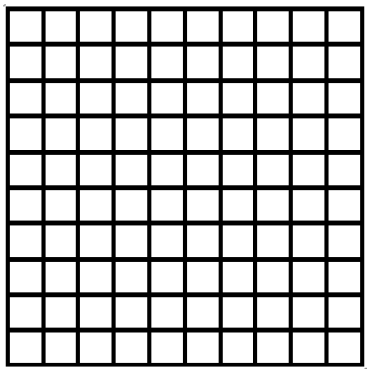
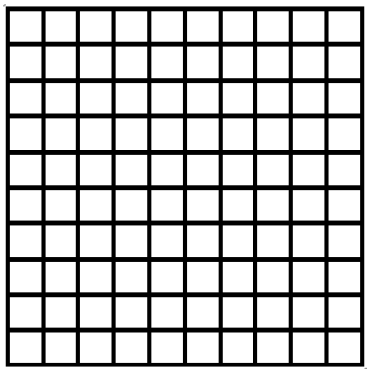
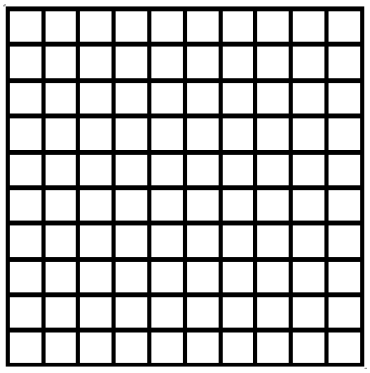
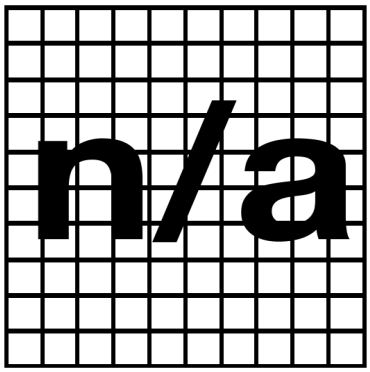
Name: _____ G7 U2 Lesson 13 - Independent Work

Remember: Percent means out of 100.

Complete each row to show equivalent fraction, decimal and percent forms. Then shade the picture. Show any scratch work in the space provided.

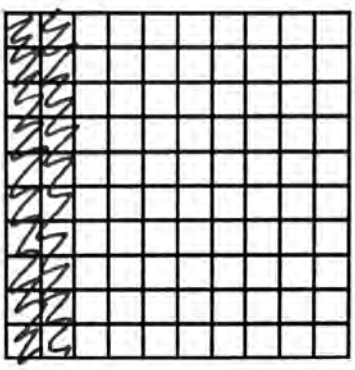
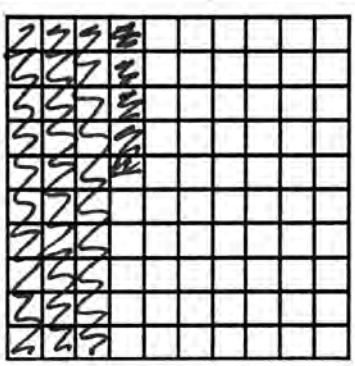
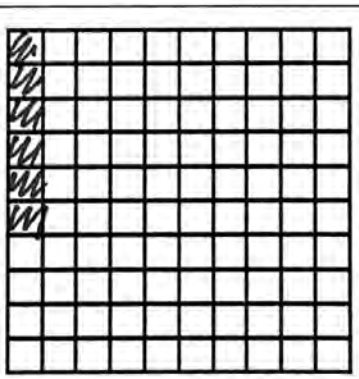
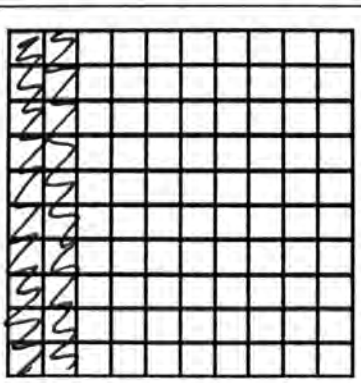
Fraction	Decimal	Percent	Picture	Work shown:
$\frac{1}{2}$				
	0.565			
		2%		
		20%		

Complete each row to show equivalent fraction, decimal and percent forms. Then shade the picture. Show any scratch work in the space provided.

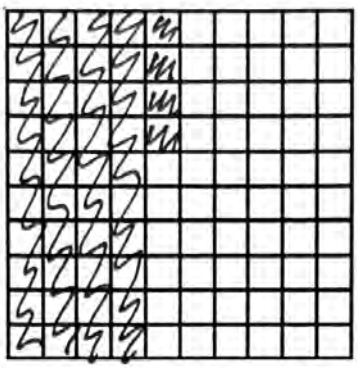
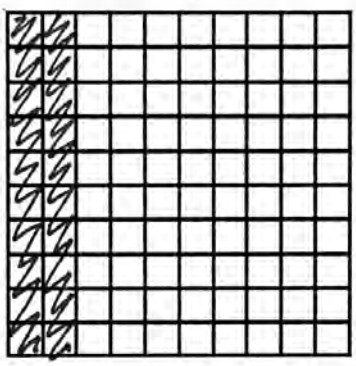
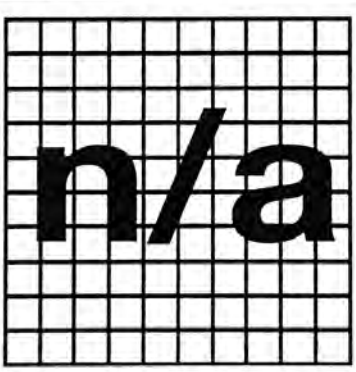
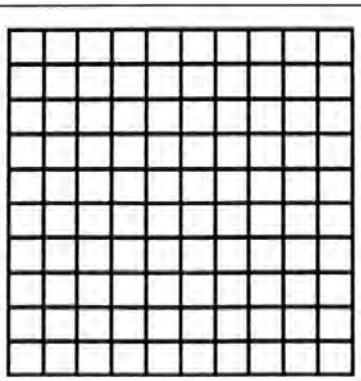
Fraction	Decimal	Percent	Picture	Work shown:
$\frac{3}{7}$				
	1.3			
		$\frac{9}{10}$%		
		200%		

Name: ANSWER KEY

Complete each row to show equivalent fraction, decimal and percent forms. Then shade the picture. Show any scratch work in the space provided.

Fraction	Decimal	Percent	Picture	Work shown:
$\frac{1}{5}$	0.2 or 0.20	20%		$5\overline{)1.00}$ -10 00
$\frac{345}{1000}$	0.345	34.5%		0.345 100
$\frac{6}{100}$ or $\frac{3}{50}$	0.06	6%		O T H 0 . 0 6
$\frac{60}{100}$ or $\frac{30}{50}$ or $\frac{3}{5}$	0.60 or 0.6	60%		

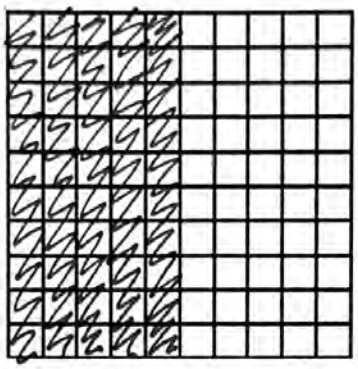
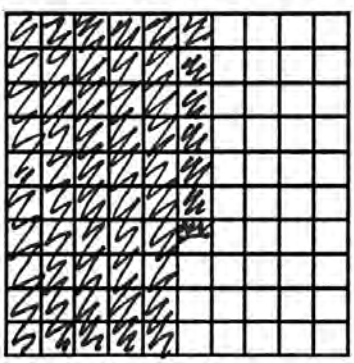
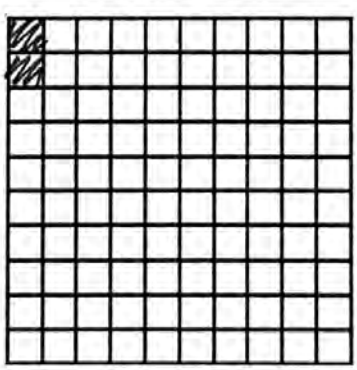
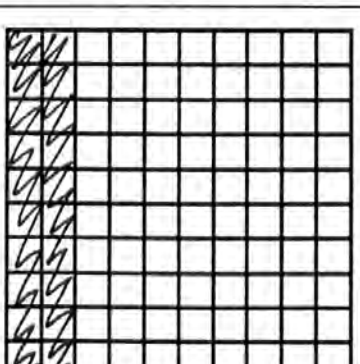
Complete each row to show equivalent fraction, decimal and percent forms. Then shade the picture. Show any scratch work in the space provided.

Fraction	Decimal	Percent	Picture	Work shown:
$\frac{4}{9}$	$0.\overline{44}$	44%		0.44 9)4.00 -36↓ 40 -36 4
$\frac{2}{10}$ or $\frac{1}{5}$	0.2	20%		$0.\frac{2}{10}0$
$\frac{500}{100}$ or $\frac{5}{1}$	5.00	500%		$5.\frac{00}{100}$
$\frac{75}{10000}$	0.0075	$\frac{3}{4}$%		$0.\frac{\frac{3}{4}}{100}$ 0.75 4)3.00 -28↓ 20 -20 00

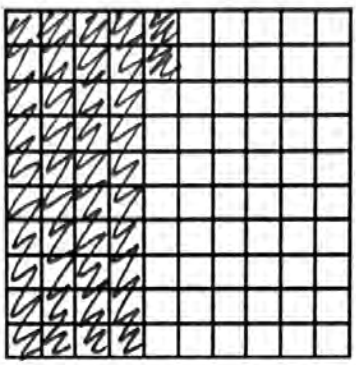
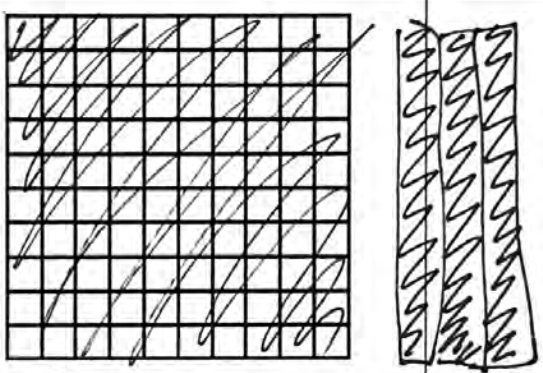
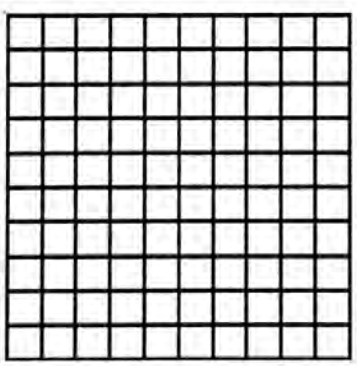
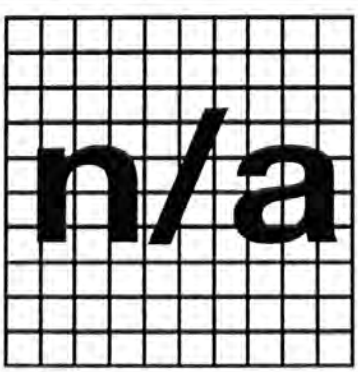
Name: ANSWER KEY

Remember: Percent means out of 100.

Complete each row to show equivalent fraction, decimal and percent forms. Then shade the picture. Show any scratch work in the space provided.

Fraction	Decimal	Percent	Picture	Work shown:
$\frac{1}{2}$	0.5 or 0.50	50%		$2\overline{)1.00}$ -10 000
$\frac{565}{1000}$	0.565	56.5%		$0.\frac{565}{1000}$
$\frac{2}{100}$ or $\frac{1}{50}$	0.02	2%		$0.\frac{2}{100}$
$\frac{20}{100}$ or $\frac{2}{10}$ or $\frac{1}{5}$	0.20 or 0.2	20%		$.\frac{20}{100}$

Complete each row to show equivalent fraction, decimal and percent forms. Then shade the picture. Show any scratch work in the space provided.

Fraction	Decimal	Percent	Picture	Work shown:
$\frac{3}{7}$	0.42	42%		$7\overline{)3.000}$ 0.42; -28; 20; -14; 6
$\frac{13}{10}$ or $1\frac{3}{10}$	1.3	130%		$1.3\frac{0}{10}$
$\frac{9}{1000}$	.009	$\frac{9}{10}$%		$.00\frac{9}{10}$; $10\overline{)9.0}$ 0.9; -90; 00
$\frac{200}{100}$ or $\frac{2}{1}$ or 2	2.00 or 2	200%		$2.\frac{00}{100}$

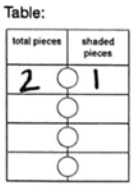
G7 U3 Lesson 2

Solve problems involving equivalent ratios with fractional quantities.

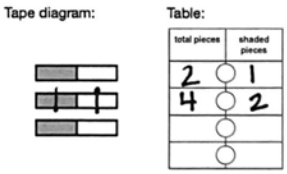
G7 U3 Lesson 2 - Today we will relate percents to proportions to find a fraction of a given amount.

Warm Welcome (Slide 1): Tutor choice

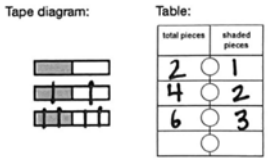
Frame the Learning/Connect to Prior Learning (Slide 2): Today we will relate percents to proportions to find a fraction of a given amount. I think it is going to blow your mind to see how you can use everything you've learned about tables and equations to solve percent problems.



Let's Review (Slide 3): A constant of proportionality shows when a relationship is proportional. We spent the whole last unit learning all about that. *Read from the slide.* "Let's draw a picture of an easy proportion and see what we notice about the constant of proportionality and the percent." Our table says "total pieces" and "shaded pieces." We'll just start with what we see in the top tape diagram. There are 2 pieces total and 1 piece is shaded. I am going to write that in the table.

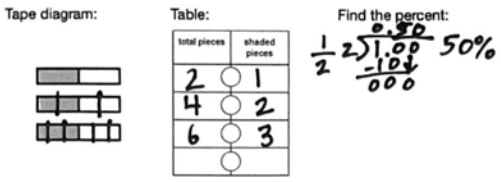


Now, we aren't going to shade any more or any less. It is going to stay this same area shaded but I am going to turn this into an equivalent fraction shaded by cutting each piece into 2. Now we have 4 total pieces and 2 pieces are shaded. This is the same picture with all equal pieces. We can see they are proportional. But also we could look across the rows. 2 divided by 1 is 2. 4 divided by 2 is 2.

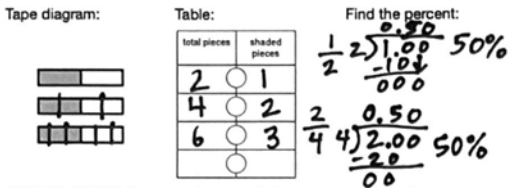


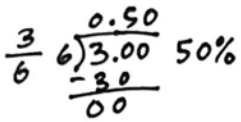
Let's do one more. This time I'll cut each piece into three pieces. Now I have 6 total pieces and 3 shaded pieces. I am going to write that in the graph. And look, we can still think of the row as 6 divided by 3 equals 2. So this is a proportion and we know there's a constant of proportionality.

But BEFORE we find the constant of proportionality let's turn each of these fractions into percents, which we learned in our last lesson. If you remember, we said you divide the top by the bottom so 1 half is 1 divided by 2. 2 doesn't go into 1. So I write 0 and I add a decimal with two zeros to bring me to the hundredths place. 2 goes into 10 five times. Subtract 10 and nothing is left. So the next place is zero. This is 50%. But wait a minute! We just divided to find the percent. But don't we divide to find the constant of proportionality?!?!? We do! We do the exact same dividing to find the constant of proportionality as we do to find the percent.



Let's do the next row. The fraction is 2 out of 4 so I divide 2 by 4. That's how I find the percent but that's also the same thing I would do to find the constant of proportionality! 4 doesn't go into 2 so I write 0 and I add a decimal with two zeros to get to the hundredths place. 4 goes into 20 five times. Subtract 20 and nothing is left. So the next place is zero. This is 0.50 or 50%.





Let's do the next row. The fraction is 3 out of 6 so I divide 3 by 6. That's how I find the percent but that's also the same thing I would do to find the constant of proportionality! 6 doesn't go into 3 so I write 0 and I add a decimal with two

zeros to get to the hundredths place. 6 goes into 30 five times. Subtract 30 and nothing is left. So the next place is zero. This is 0.50 or 50%.

Table:

total pieces	shaded pieces
2	1
4	2
6	3

All we were doing was reviewing things you've already learning but we've already seen the most important idea of today: just like we divide to find the constant of proportionality, we divide to find the percent. So the percent IS THE SAME as the constant of proportionality. I can put "times zero point five" in each of these circles to see the proportion.

Table:

total pieces	shaded pieces
2	1
4	2
6	3
100	50

And if I put 50% on the table. That would be 100 total pieces time 0.5 gets us 50 shaded pieces. That 50 is the percent and it is the same as the constant of proportionality.

Let's Talk (Slide 4): A percent is a constant of proportionality that relates a part to a whole. Imagine we want to continue the table from the last slide with a different total. This is filled in with the numbers from the last slide. Just like for the proportions from our last unit, we could write a multiplication equation, we can write one here. It will be TOTAL x PERCENT = PART. Or in this case, TOTAL x 0.5 = PART. Again, we can do that because we just saw that we did the same thing to find the constant of proportionality that we did to turn these fractions into percents. The percent IS the constant of proportionality.

Write an equation using 50%:
TOTAL × PERCENT = PART
TOTAL × 0.5 = PART

Table:

total pieces	shaded pieces
2	1
4	2
6	3
100	50
24	

So, now we want to know, "How many pieces would be shaded out of 24 pieces?" I am going to put 24 on my table.

How many pieces would be shaded out of 24 pieces?
24 × 0.5 = ?

I can see that I just multiply 24 x 0.5 equals question mark.

2
24
× 0.5
120

I think of it as 24 x 5. Then we do 5 times 4 is 20. Carry the 2. 5 times 2 is 10 plus the 2 is 12. We get 120 but now we have to put in the decimal. There was one place in the problem so I have one place in my answer. It's 12!

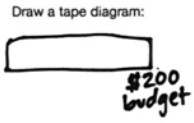
Table:

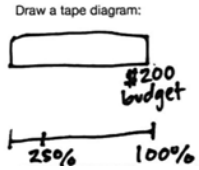
total pieces	shaded pieces
2	1
4	2
6	3
100	50
24	12

Let's put that on our table! It makes a lot of sense with everything else we see.

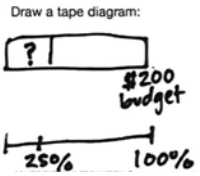
Let's draw a picture. There would be twelve shaded pieces then twelve other pieces. That's 24 pieces altogether and 12 shaded. We just found 50% of 24. The good news is that we don't have to go through all these steps every time. Now that we see the percent is the constant of proportionality, we can just jump to this equation. Let's do one more example.

Let's Think (Slide 5): Since percents are just proportions in disguise, we can use a table diagram, a table or an equation to solve them. Read the problem silently with your eyes while I read the problem out loud. "Lisa has a budget of $200 for her garden this year. So far, she has spent 25% of her budget on dirt! How much of her budget has Lisa spent so far?" It is always a good idea to draw a picture for a story problem so let's start there. It says, "Lisa has a budget of $200 for her garden" so I am going to draw a rectangle and label is $200 budget.



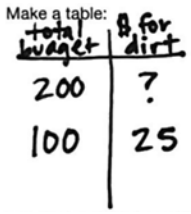


Next it says, "she has spent 25% of her budget on dirt." I am going to draw that underneath what we just drew and I am going to line it up really carefully. We know 25 percent means 25 out of 100. So the whole amount is 100. And I think 25 goes about here.



When the question asks, "how much of her budget has Lisa spent so far?" It is asking for the part of the $200 budget so I can mark the part that lines up with 25% with a question mark. And I will write dollars for dirt. You can see how this is a proportion just like the fractions we just drew. And I'll warn you now that for today's problems the drawings might seem a bit tedious. But in our very next lesson, they can get complicated so we will want to draw a picture for every story problem no matter what.

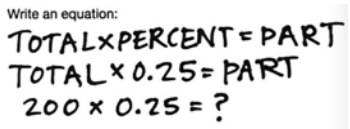
Now let's make a table. To help us see how the percent is the constant of proportionality, I am going to make the first column the total. In this case, that's the total budget. And then the next column is the part, dollars for dirt. For right now, it is going to feel obvious where to put the numbers. But again, in our next lesson it gets more complicated so don't skip any steps.



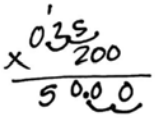
I know that 200 is the total budget and we don't know the money for dirt. 100 is the total percent and 25 is part of the percent.

Now I can see why it is so useful to know the percent is the constant of proportionality in disguise. The secret operation happening here is x0.25.

So that's is the operation I am going to use to find the part of the $200 too! Let's write this as an equation before we do any number crunching. On our last slide, we said, "TOTAL x PERCENT = PART."



I am going to put in the $200 x 0.25 equals question mark.



Now we can do the math to the side. 200 x 25 is 5000. Now I need to put in the decimal spaces. There are two spaces so this is 50.00.

The question said, how much of her budget has Lisa spent so far. So far, Lisa has spent $50. We used the percent like a constant of proportionality to get our answer.

Let's Try It (Slide 6): Now we will practice using the percent as the proportionality to solve some problems. I will lead you through step by step.

WARM WELCOME

Today we will relate percents to proportions to find a fraction of a given amount.

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Let's Review:

A constant of proportionality shows when a relationship is proportional.

Let's draw a picture of an easy proportion and see what we notice about the constant of proportionality and the percent.

Tape diagram:

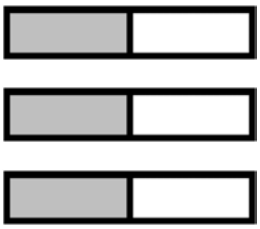


Table:

total pieces	shaded pieces

Find the percent:

Let's Talk:

A percent is a constant of proportionality that relates a part to a whole.

Imagine we want to continue the table from the last side with a different total.

Tape diagram:

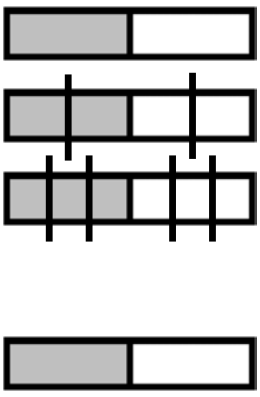


Table:

total pieces		shaded pieces
2	x 0.5	1
4	x 0.5	2
6	x 0.5	3
100	x 0.5	50
	x 0.5	

Write an equation using 50%:

How many pieces would be shaded out of 24 pieces?

Let's Think:

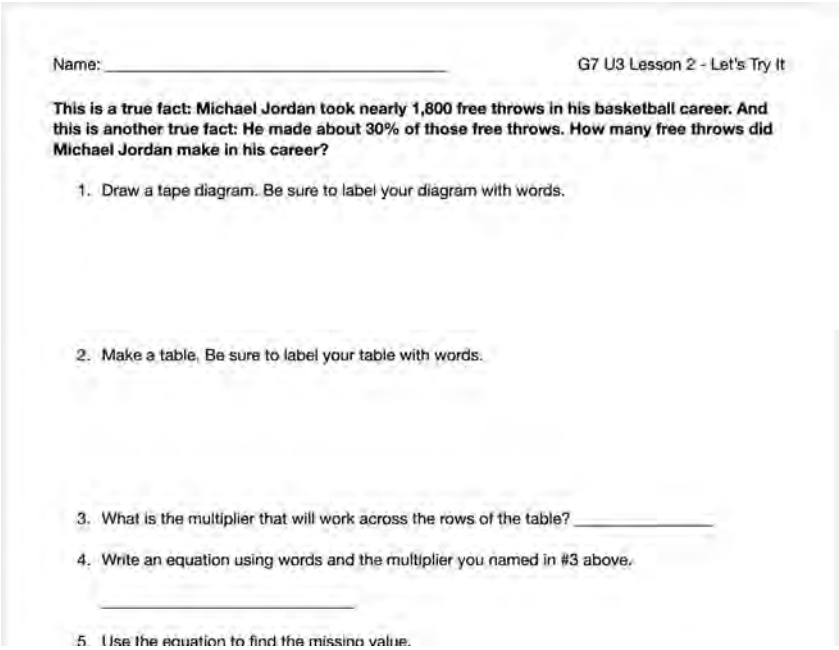
Since percents are just proportions in disguise, we can use a tape diagram, a table or an equation to solve them.

Lisa has a budget of $200 for her garden this year. So far, she has spent 25% of her budget on dirt! How much of her budget has Lisa spent so far?

Draw a tape diagram: Make a table: Write an equation:

Let's Try It:

We will do it together step by step!



Name: _____ G7 U3 Lesson 2 - Let's Try It

This is a true fact: Michael Jordan took nearly 1,800 free throws in his basketball career. And this is another true fact: He made about 30% of those free throws. How many free throws did Michael Jordan make in his career?

1. Draw a tape diagram. Be sure to label your diagram with words.

2. Make a table. Be sure to label your table with words.

3. What is the multiplier that will work across the rows of the table? _____

4. Write an equation using words and the multiplier you named in #3 above.

_____

5. Use the equation to find the missing value.

On your Own:

Now it's time for you to do it on your own.

Name: _____ G7 U2 Lesson 13 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. There are 24 kids in class today. 80% of them were on time. How many kids were on time today? Tape diagram:	Table: Equation:
2. Lisa wants to buy jeans for $150. She has a 25% off coupon. What discount will she get? Tape diagram:	Table: Equation:
3. Audrey did her HW for 90 minutes. She spent 35% of the time on math. How long did Audrey spend on math?	Table:

This is a true fact: Michael Jordan took nearly 1,800 free throws in his basketball career. And this is another true fact: He made about 30% of those free throws. How many free throws did Michael Jordan make in his career?

1. Draw a tape diagram. Be sure to label your diagram with words.

2. Make a table. Be sure to label your table with words.

3. What is the constant of proportionality for this table? _____

4. Write an equation using the constant of proportionality:

   _____

5. Use the equation to find the missing value.

6. Write your answer in a complete sentence.

_____

_____

Name: _____ G7 U3 Lesson 2 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. There are 24 kids in class today. 80% of them were on time. How many kids were on time today? Tape diagram:	Table: Equation:
2. Lisa wants to buy jeans for $150. She has a 25% off coupon. What discount will she get? Tape diagram:	Table: Equation:
3. Audrey did her HW for 90 minutes. She spent 35% of the time on math. How long did Audrey spend on math? Tape diagram:	Table: Equation:
4. Hudson needs 50 gallons of paint for his mural project. He has 75% of what he needs. How much paint does Hudson have? Tape diagram:	Table: Equation:

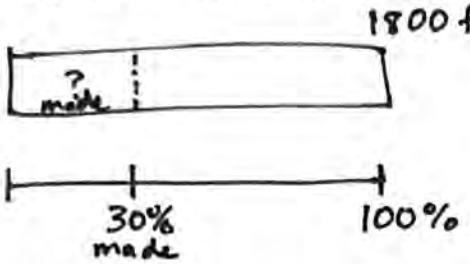
Solve each problem using an equation and a table.

5. The math test today had 25 questions. Emanda got 80% of the questions right. How many questions did Emanda get right? Tape diagram:	Table: Equation:
6. The chemical reaction takes 8 minutes to complete. So far it is 32% through. How many minutes must have passed so far? Tape diagram:	Table: Equation:
7. The movie is 120 minutes long. Imagine you have watched 30% of it. How many minutes have you watched? Tape diagram:	Table: Equation:
8. Jason saved $80. The bank gave him 1% interest on his savings. How much money did the bank give Jason? Tape diagram:	Table: Equation:

Name: ANSWER KEY

This is a true fact: Michael Jordan took nearly 1,800 free throws in his basketball career. And this is another true fact: He made about 30% of those free throws. How many free throws did Michael Jordan make in his career?

1. Draw a tape diagram. Be sure to label your diagram with words.



2. Make a table. Be sure to label your table with words.

total free throws	free throws made
1800	?
100	30

3. What is the constant of proportionality for this table? 0.30 or 0.3

4. Write an equation using the constant of proportionality:

TOTAL × 0.3 = PART

5. Use the equation to find the missing value.

1800 × 0.3 = ?

540 = ?

$$\begin{array}{r} {}^{2}1800 \\ \times\ 3 \\ \hline 540.0 \end{array}$$

6. Write your answer in a complete sentence.

Michael Jordan made 540 out of the 1800 free throws.

Name: ANSWER KEY

G7 U3 Lesson 2 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. There are 24 kids in class today. 80% of them were on time. How many kids were on time today?

Tape diagram:

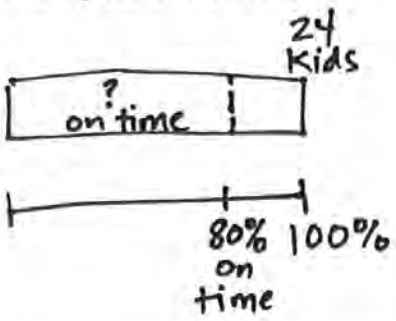


Table:

class kids	kids on time
24	?
100	80

(×0.8)

Equation:

$24 \times 0.8 = ?$

$TOTAL \times 0.8 = PART$

$19.2 = ?$

2. Lisa wants to buy jeans for $150. She has a 25% off coupon. What discount will she get?

Tape diagram:

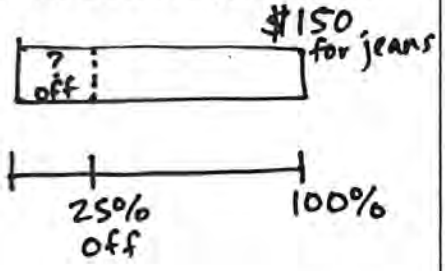


Table:

$ for jeans	$ off
150	?
100	25

(×.25)

Equation:

$150 \times .25 = ?$

$37.5 = ?$

3. Audrey did her HW for 90 minutes. She spent 35% of the time on math. How long did Audrey spend on math?

Tape diagram:

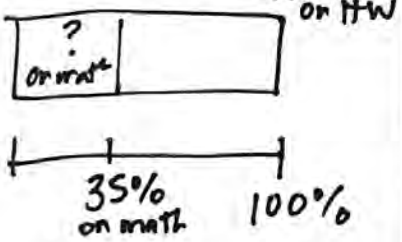


Table:

min on HW	min on math
90	?
100	35

(×0.35)

Equation:

$90 \times 0.35 = ?$

$31.5 = ?$

4. Hudson needs 50 gallons of paint for his mural project. He has 75% of what he needs. How much paint does Hudson have?

Tape diagram:

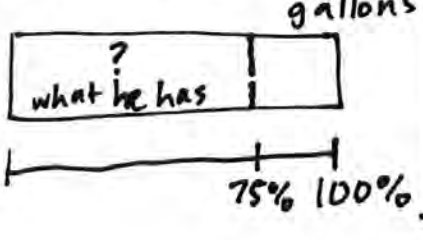


Table:

gallons he needs	gallons he has
50	?
100	75

(×0.75)

Equation:

$50 \times 0.75 = ?$

$37.5 = ?$

Solve each problem using an equation and a table.

5. The math test today had 25 questions. Emanda got 80% of the questions right. How many questions did Emanda get right?

Tape diagram:

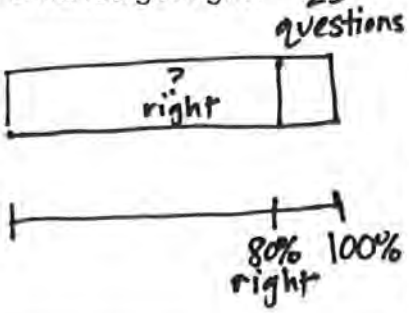


Table:

questions on the test		questions right
25	×0.8	?
100	×0.8	80

Equation:

$25 \times 0.8 = ?$

$20 = ?$

6. The chemical reaction takes 8 minutes to complete. So far it is 32% through. How many minutes must have passed so far?

Tape diagram:

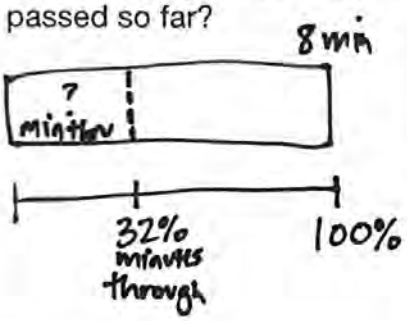


Table:

min to complete		min through
8	×0.32	?
100	×0.32	32

Equation:

$8 \times 0.32 = ?$

$2.56 = ?$

7. The movie is 120 minutes long. Imagine you have watched 30% of it. How many minutes have you watched?

Tape diagram:

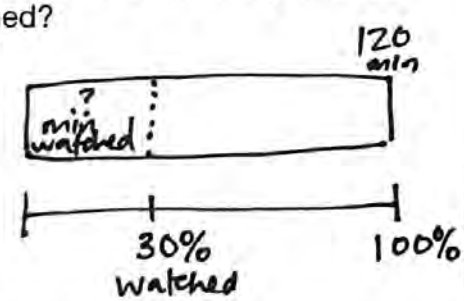


Table:

min of movie		min watched
120	×0.3	?
100	×0.3	30

Equation:

$120 \times 0.3 = ?$

$36 = ?$

8. Jason saved $80. The bank gave him 1% interest on his savings. How much money did the bank give Jason?

Tape diagram:

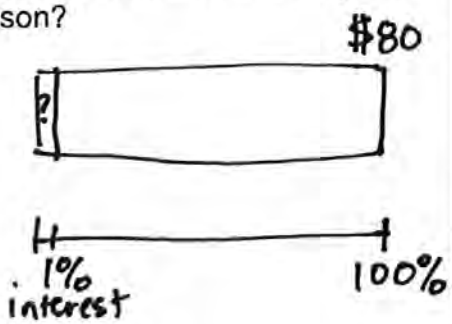


Table:

$ saved		# interest
80	×0.01	?
100	×0.01	1

Equation:

$80 \times 0.01 = ?$

$0.80 = ?$

G7 U3 Lesson 3

Calculate and interpret the scale factor and constant of proportionality for a proportional relationship.

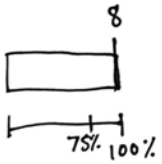
G7 U3 Lesson 3 - Today we will find the part, the total or the percent in story problems.

Warm Welcome (Slide 1): Tutor choice

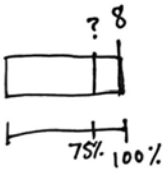
Frame the Learning/Connect to Prior Learning (Slide 2): Today we will find the part, the total or the percent in story problems. That's a lot of different kind of story problems so we're going to have to read carefully. Let's dive in!

Let's Review (Slide 3): We learned in our last class that we can use the percent like a constant of proportionality. Read this problem silently along with me while I read out loud. "Lisa is at work for 8 hours. While she is gone, her kitties spend 75% of the time watching the birds out the window. How long do the kitties spend watching the birds?" Let's draw a tape diagram first. It says, "Lisa is at work for 8 hours" so I will draw a bar and call it 8 hours at work.

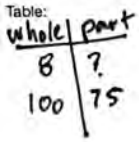
Then it says, "While she is gone her kitties spend 75% of the time watching the birds" so I will draw a line for the percent and I will mark 100 altogether because percent means out of 100. And let's estimate that 75 is around here.



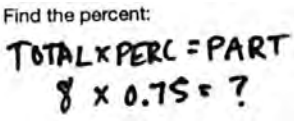
Then it says, "How long do the kitties spend watching the birds?" Now I have to ask myself a key question here and I am going to be asking a version of it for every problem today. The question is, "Is the kitties watching the birds, part of the 8 hours or the whole amount of hours?" The kitties spend part of the time watching the birds so this question is asking for part. I will draw that with a question mark here.



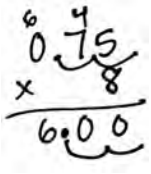
Now we can set up a table with the whole amount in the first column and the part in the second column. The whole column is hours gone. The part column is hours watching birds. I have 8 whole hours gone. I don't know the part watching birds. For the percent, 100 is always the whole amount and the part is 75. v



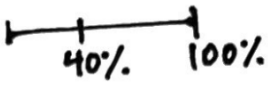
I can fill in the percent as the constant of proportionality. I can see this bottom row is x0.75 so the top line must be x0.75 too. But let's write our equation: TOTAL x PERCENT = PART. That is going to be 8 x 0.75 equals question mark.



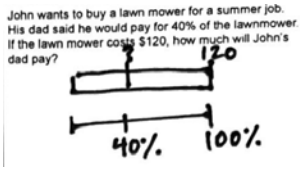
I am going to multiply on the side here. I can just do 8 x 75. 8 times 5 is 40. Carry the 4. 8 x 7 is 56 plus 4 is 60. My answer is 600. But I left off two decimal places so I have to put those back in. I get 6.00. If Lisa is at work for 8 hours, then the kitties watch the birds for 6 hours. That sounds very sweet.



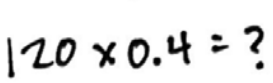
Let's Talk (Slide 4): There are two other kinds of problems we could be asked to answer. It says here, "We need to read carefully to be sure about whether we are looking for the part or the whole or the percent. Draw a tape diagram to determine if these two problems are the same." Read the first problem silently along with me while I read it out loud. "John wants to buy a lawn mower for a summer job. His dad said he would pay for 40% of the lawnmower. If the lawn mower costs $120, how much will John's dad pay?" Let's reread and draw it sentence by sentence WITH WORDS. The first sentence doesn't give us a lot of numerical information. Let's look at the next sentence. It says, "His dad says he would pay for 40% of the lawnmower." We can draw a line for that.



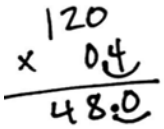
We mark 40% but we also mark 100%. And let's put some words. 40% is the part that the dad will pay and 100% is the whole amount for the lawnmower.



Then it says, "If the lawn mower costs $120…" That's the whole cost of the lawn mower so I'll draw a rectangle for that with $120 for the whole cost. And I have a question mark for the part that the dad will pay.

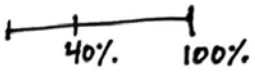


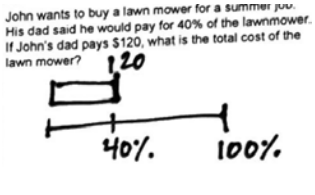
Now, we know we have the equation: WHOLE x PERCENT = PART. In this case, 120 is the whole times 0.40 which is the percent equals question mark.



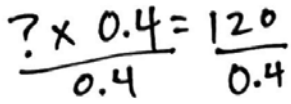
I multiply 120 times 0.4 on the side. I get 4 times 0 is 0. 4 times 2 is 8. 4 times 1 is 4. So, 480 but there is one decimal place so I'll put that in. My answer is $48. John's dad will pay $48.

Let's see if that's the same as the next problem. Read along with me silently while I read out loud. "John wants to buy a lawn mower for a summer job. His dad said he would pay for 40% of the lawnmower. If John's dad pays $120, what is the total cost of the lawn mower?" Now we will draw. The dad still says he'll pay 40%. So we will draw the line with 40% and 100%.



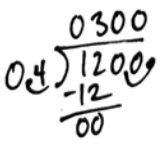


But look at the next line. This time it says, "If John's dad pays $120…" This is different! It says what John's dad pays, which is the part not the total whole amount. When I draw this picture, I still have a rectangle but this time the 120 goes as the part that the dad pays. The question mark is the whole amount because the question asked, "What is the total cost of the lawn mower?"



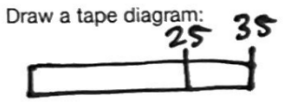
We can still use the equation: WHOLE x PERCENT = PART. But now the location of the numbers is different because it's a different story. We don't know the whole. I'll write a question mark there. That question is times 0.40, which is the percent. And that equals 120, which is the part this time. I can't figure out the question mark just by looking at it. I am going to divide by 0.4 on each side.

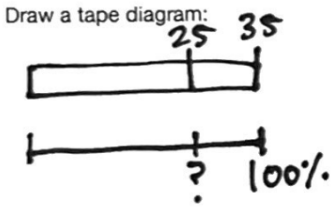
Then over on the side of my paper, I do 120 divided by 0.4. Hopefully from sixth grade you remember that you can divide by a decimal so you shift the decimal point one place in the divisor which means you shift the decimal point one place in the dividend. Now I can do the math. 4 doesn't go into 1 so I put a zero. 4 goes into 12 three times. That's minus 12 with a remainder of 0. It is really tempting to stop here but it's really important that I keep the place value. I have two more spaces after that twelve so I need two more zeros. My answer is 300. And that makes sense, right? If the dad pays $120 then the total cost of the lawn mower must be more than that. It will cost $300 altogether.



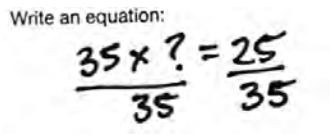
These two problems were NOT the same. In the first problem, the 120 was the total amount. In the second problem, the 120 was the partial amount. We have to draw a picture carefully to represent the story before we can jump into number-crunching.

Let's Think (Slide 5): Let's do one more example. This says, "We need to identify what is the part and what is the whole in any percent story problem." Read the problem silently with me while I read out loud. "Rose surveyed 35 of her classmates about whether they were Taylor Swift fans. 25 of the classmates said yes. What percent of the people surveyed are Taylor Swift fans?" We're going to draw, of course! When I read that Rose surveyed 35 people and 25 said yes to being Taylor Swift fans, I can hear the part and the whole. So on my rectangle, I will draw 35 people and then mark 25 as part of the 35.



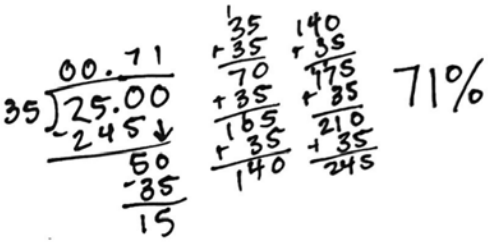


The question says, "What percent of the people surveyed are Taylor Swift fans?" Even though there are no obvious numbers in that question, I can still draw a percent line. I know the whole percent is 100% and I can mark a question mark to show that I'm looking for the percent out of 100.



We still have our equation: WHOLE x PERCENT = PART. This time I know the whole but I don't know the percent. So I will have 35 times question mark equals 25. To solve for the question mark, I divide by 35 on both sides.

I get some tricky division here that I'm going to have to do on the side. It's actually not that different than when I divide a fraction to find the percent. This is a fraction actually. 25 kids like Taylor Swift out of 35 total kids. So, 35 doesn't go into 25. I put two zeros. Then I add a decimal and annex 2 zeros so I can divide to the hundredths place. My percent is out of 100 so I will be looking to the hundredths place. This is the first time we've divided by such a big number in this unit. It's not a big deal except you probably can't skip count by 35. I am just going to add up 35's on the side of my paper to see how many times it goes into 250. 35 plus 35 is 70. 70 plus 35 is 105. 105 plus 35 is 140. 140 plus 35 is 175. 175 plus 35 is 210. 210 plus 35 is 245. *Point to each 35 that you added as you count.* I added 1 - 2 - 3 - 4 - 5 - 6 - 7 thirty-fives. So I put 7 on my division. That's minus 245. That leaves me with 5. Now I pull down the zero. 35 goes into 50 one time. I subtract 35. There's going to be a remainder of 15 but I've got what I need. This is 71%. 71% of the people that Rose surveyed said they like Taylor Swift. Alright, Taylor!



Let's Try It (Slide 6): Now we will practice solving more percent problems. I will lead you through step by step.

WARM WELCOME

Today we will find the part, the total or the percent in story problems.

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Let's Review:

We can use the percent like a constant of proportionality.

Lisa is at work for 8 hours. While she is gone, her kitties spend 75% of the time watching the birds out the window. How long do the kitties spend watching the birds?

Tape diagram: Table: Find the percent:

Let's Talk:

We need to read carefully to be sure about whether we are looking for the part or the whole or the percent.

Draw a tape diagram to determine if these two problems are the same.

John wants to buy a lawn mower for a summer job. His dad said he would pay for 40% of the lawnmower. If the lawn mower costs $120, how much will John's dad pay?	John wants to buy a lawn mower for a summer job. His dad said he would pay for 40% of the lawnmower. If John's dad pays $120, what is the total cost of the lawn mower?

Let's Think:

We need to identify what is the part and what is the whole in any percent story problem.

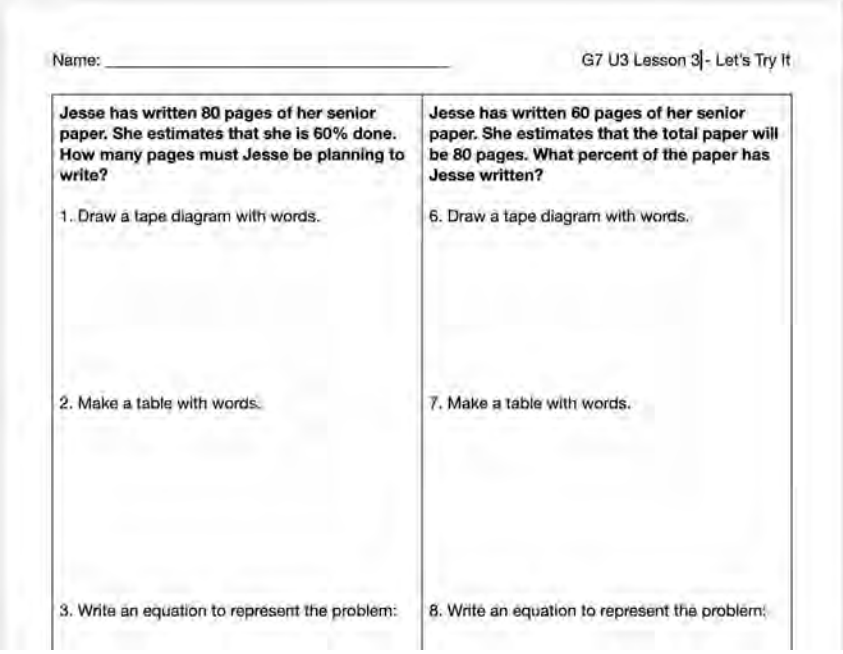
Rose surveyed 35 of her classmates about whether they were Taylor Swift fans. 25 of the classmates said yes. What percent of the people surveyed are Taylor Swift fans?

Draw a tape diagram:

Write an equation:

Let's Try It:

We will do it together step by step!



Name: _____ G7 U3 Lesson 3 - Let's Try It

Jesse has written 80 pages of her senior paper. She estimates that she is 60% done. How many pages must Jesse be planning to write?	**Jesse has written 60 pages of her senior paper. She estimates that the total paper will be 80 pages. What percent of the paper has Jesse written?**
1. Draw a tape diagram with words.	6. Draw a tape diagram with words.
2. Make a table with words.	7. Make a table with words.
3. Write an equation to represent the problem:	8. Write an equation to represent the problem:

On your Own:

Now it's time for you to do it on your own.

Name: _____ G7 U3 Lesson 3 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. If a student answers 15 out of 20 questions on a quiz, what percentage of questions did they answer correctly? Tape diagram:	Table: Equation:
2. Annaleah wants to buy a Lego set that costs $400. So far she has saved 45% of the price. How much has Annaleah saved? Tape diagram:	Table: Equation:
3. The FDA recommends that a person eat 70 grams of protein in a day. So far, Roxanna has eat 50 grams of protein. What percent of the recommendation has Roxanna eaten?	Table:

Jesse has written 80 pages of her senior paper. She estimates that she is 60% done. How many pages must Jesse be planning to write?

1. Draw a tape diagram with words.

2. Make a table with words.

3. Write an equation to represent the problem:

_____

4. Use the equation to find the missing value.

5. Write your answer in a complete sentence.

_____

_____

_____

Jesse has written 60 pages of her senior paper. She estimates that the total paper will be 80 pages. What percent of the paper has Jesse written?

6. Draw a tape diagram with words.

7. Make a table with words.

8. Write an equation to represent the problem:

_____

9. Use the equation to find the missing value.

10. Write your answer in a complete sentence.

_____

_____

_____

Name: _____ G7 U3 Lesson 3 - Independent Work

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3. The FDA recommends that a person eat 70 grams of protein in a day. So far, Roxanna has eat 50 grams of protein. What percent of the recommendation has Roxanna eaten? Tape diagram:	Table: Equation:
4. Julia's phone loses 15% of its charge in 3 hours. If the phone loses its charge at a constant rate, how long would we expect it to take to lose all its charge? Tape diagram:	Table: Equation:

Solve each problem using an equation and a table.

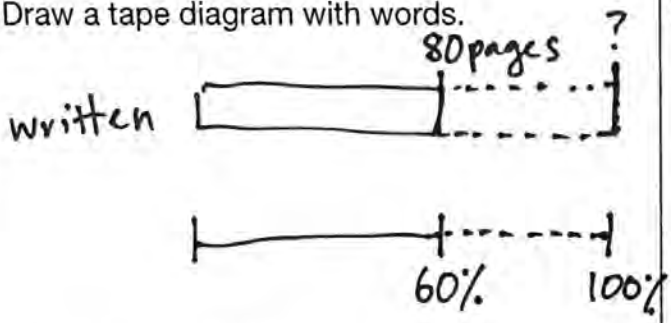
5. The flight from California to Peru is 10 hours. So far, Nick has been on the flight for 3 hours. What percent of the trip has Nick completed? Tape diagram:	Table: Equation:
6. The directions on Patrick's fish tank says that 40% of water should be salt water and the rest should be fresh water. If Patrick puts in 12 gallons of salt water, how much water must the tank hold? Tape diagram:	Table: Equation:
7. Tony recycles 10% of his household waste. If he has 25 pounds of waste this week, how many pounds would we expect to be recycled? Tape diagram:	Table: Equation:
8. Benny took 40 free throws this year. He made 15 of them. What percent of free throws did Benny make this year? Tape diagram:	Table: Equation:

Name: ANSWER KEY

G7 U3 Lesson 3 - Let's Try It

Jesse has written 80 pages of her senior paper. She estimates that she is 60% done. How many pages must Jesse be planning to write?

1. Draw a tape diagram with words.



2. Make a table with words.

planning	written
?	80
100	60

3. Write an equation to represent the problem:

whole × percent = part

4. Use the equation to find the missing value.

$\frac{? \times 0.6}{0.6} = \frac{80}{0.6}$

$0.6\overline{)80.0}$ → 133

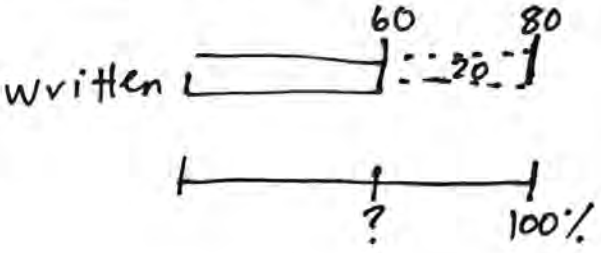
133

5. Write your answer in a complete sentence.

Jesse must be planning to write about 133 pages.

Jesse has written 60 pages of her senior paper. She estimates that the total paper will be 80 pages. What percent of the paper has Jesse written?

6. Draw a tape diagram with words.



7. Make a table with words.

whole	part
80	60
100	?

8. Write an equation to represent the problem:

whole × percent = part

9. Use the equation to find the missing value.

$\frac{80 \times ?}{80} = \frac{60}{80}$

$80\overline{)60.00}$ → 0.75

75%

10. Write your answer in a complete sentence.

Jesse has written 75% of the paper.

Name: ANSWER KEY G7 U3 Lesson 3 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. If a student answers 15 out of 20 questions on a quiz, what percentage of questions did they answer correctly?

Tape diagram:

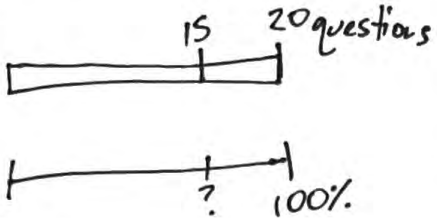


Table:

total	part
20	15
100	?

Equation: $\frac{20 \times ?}{20} = \frac{15}{20}$

0.75
20)15.00
-140
100
-100
000

75%

2. Annaleah wants to buy a Lego set that costs $400. So far she has saved 45% of the price. How much has Annaleah saved?

Tape diagram:

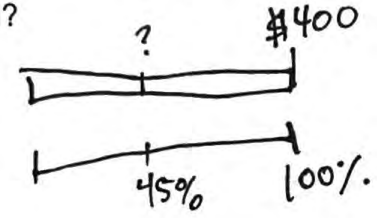


Table:

total	part
400	?
100	45

Equation: $400 \times 0.45 = ?$

2
045
× 400
18000

$180

3. The FDA recommends that a person eat 70 grams of protein in a day. So far, Roxanna has eat 50 grams of protein. What percent of the recommendation has Roxanna eaten?

Tape diagram:

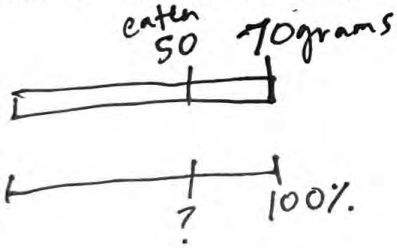


Table:

total	part
70	50
100	?

Equation: $\frac{70 \times ?}{70} = \frac{50}{70}$

0.71
70)50.00
490
-100
-70
30

71%

4. Julia's phone loses 15% of its charge in 3 hours. If the phone loses its charge at a constant rate, how long would we expect it to take to lose all its charge?

Tape diagram:

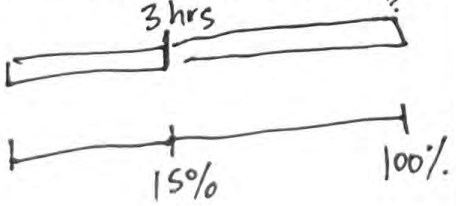


Table:

total	part
?	3
100	15

Equation: $\frac{? \times 0.15}{0.15} = \frac{3}{0.15}$

020
015)300
-30
00

20 hours

Solve each problem using an equation and a table.

5. The flight from California to Peru is 10 hours. So far, Nick has been on the flight for 3 hours. What percent of the trip has Nick completed?

Tape diagram:

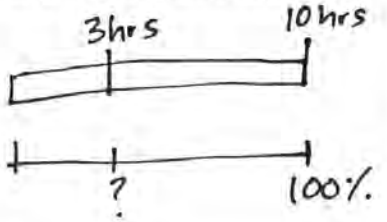


Table:

whole	part
10	3
100	?

0.30
$10\overline{)3.00}$
$-30\downarrow$
000

Equation: $\frac{10 \times ?}{10} = \frac{3}{10}$

30%

6. The directions on Patrick's fish tank says that 40% of water should be salt water and the rest should be fresh water. If Patrick puts in 12 gallons of salt water, how much water must the tank hold?

Tape diagram:

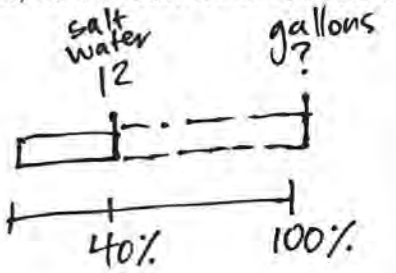


Table:

whole	part
?	12
100	40

030
$04\overline{)120}$
-12
000

Equation: $\frac{? \times 0.4}{0.4} = \frac{12}{0.4}$

30 gallons

7. Tony recycles 10% of his household waste. If he has 25 pounds of waste this week, how many pounds would we expect to be recycled?

Tape diagram:

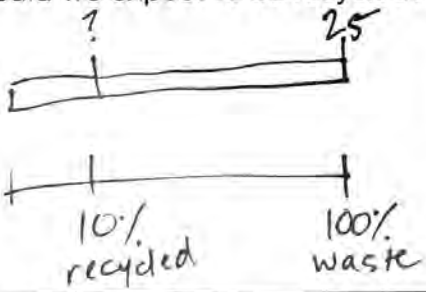


Table:

whole	part
25	?
100	10%

25
$\times 0.1$
2.5

Equation: $25 \times 0.1 = ?$

2.5 pounds

8. Benny took 40 free throws this year. He made 15 of them. What percent of free throws did Benny make this year?

Tape diagram:

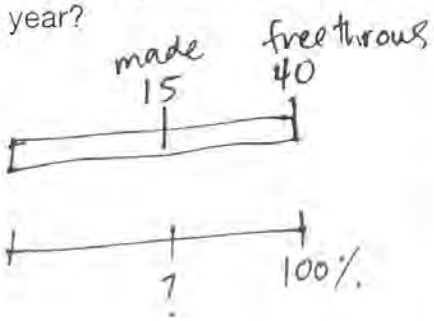


Table:

whole	part
40	15
100	?

00.37
$40\overline{)15.00}$
120
300
280
20

Equation: $\frac{40 \times ?}{40} = \frac{15}{40}$

37%

G7 U3 Lesson 4

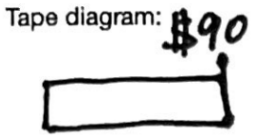
Use fractions to describe increases and decreases.

G7 U3 Lesson 4 - Today we will use percents to compare quantities.

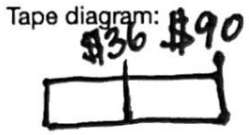
Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we will use percents to compare quantities. We are going to use the same steps we used in our last lesson to a new idea.

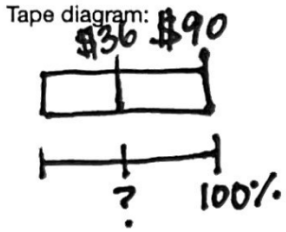
Let's Review (Slide 3): We already know we can use a multiplication equation to solve percent problems. Read along silently with eyes while I read out loud, "Lisa has saved $90. She is going to spend $36 on a hat. What percent of Lisa's money does she plan to spend?" We know that we always draw a tape diagram for any word problem. That helps us figure out what is the whole and what is the part. It says, "Lisa has saved $90." So I am going to draw a box and call it $90.



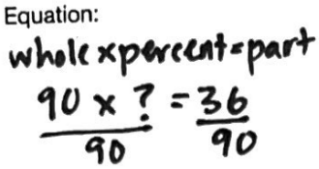
Now it says, "She is going to spend $36 on a hat." I know that the money she is going to spend is part of the money she has saved so I am going to draw it as a part.



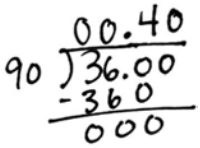
Now the question is asking, "What percent of Lisa's money does she plan to spend?" So I have to draw a percent line. I know 100 is the whole percent but I don't know the percent that represents the part. So I will put a question mark.



When I make a table with this information, it is super interesting because the question mark is in a different spot. I know 90 is the money saved and 36 is the money to spend. 100 is the whole. I don't know the percent. Which also means I don't know the constant of proportionality. In other words, I don't know what to multiply each row in my table by.



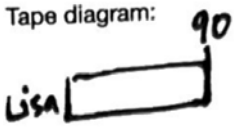
Luckily I have the equation that relates all these numbers: WHOLE x PERCENT = PART. I put 90 as the whole times question mark equals 36. Then to solve for the question mark, I have to divide by 90 on each side.

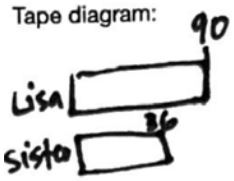


Let me draw my division box to the side. It's 36 divided by 90. That's zero but then I add a decimal and annex two zeros. I can do 90 into 360 just like 9 into 36. That's 4. So, I get 4 and subtract 360. There's zero so the next digit is zero. And there's my answer in the hundredths place. Lisa is going to spend 40% of her money. That is helpful to hear as a percent. For example, we can hear that it is less than half. Percents are super helpful like that. So let's see another way we can use them.

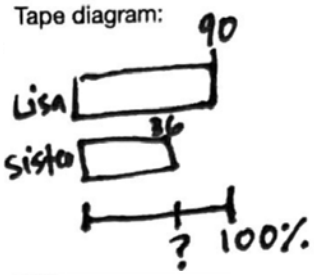
Let's Talk (Slide 4): We can also use percents to compare two quantities. In this case, we aren't going to have a part and a whole like one number is part of another. But we can think of them that way to solve the problem. Let me show you what I mean. Read the problem silently while I read out loud.

"Lisa has saved $90. Her sister has saved $36. What percent of Lisa's money does Lisa's sister have?" This problem has the exact same numbers, 90 and 36. We know that percent is 40% because we just did the problem. The point here is that Lisa has save money and her sister has saved money. Her sister's money isn't PART of Lisa's money. There is no part and whole. But we can still compare them and percents are still really helpful to have a sense of how their size compares to each other. Let's draw a picture. It says, "Lisa has saved $90." I am going to draw a rectangle and label it $90.





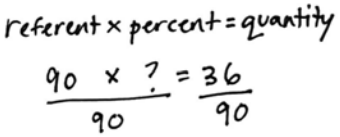
Next it says, "Her sister has saved $36." We already said that the sister's money is not part of Lisa's money. So, I am not going to draw it as a part. I am going to have to draw a whole new rectangle that is lined up right at the beginning. It's shorter, right?

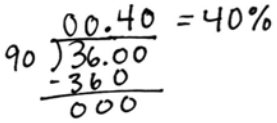


But the question is still a percent question so I still need a percent line. Here's the very most important thing. I have to be clear on the percent OF WHAT to know where the 100% is. It says what percent OF LISA'S MONEY. So we are going to use Lisa's money as if it's the whole because it's what we want to find the percent of. We call that the referent because it's the number that the percent is referring to. That number is like 100% and now I can mark a question mark for where the other number is a percent of it.

The table looks the same as it did before. I have 90 compare to 36. Then I have 100 and I don't know the percent compared to 100. But we can see how this is still like a proportion even though it's not a part and a whole.

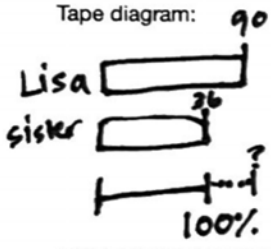
So, I am going to take our old equation that was WHOLE x PERCENT = PART and I am just going to think of it as REFERENT x PERCENT = QUANTITY. There isn't a part and whole. But there are two numbers and one is the referent, the number that we're referring or comparing to. The other is just the quantity we're comparing to the referent. I plug in the numbers like always. 90 x question mark equals 36. We divide by 90 on both sides.



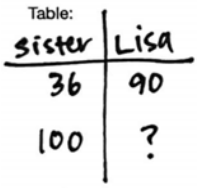


And we already know from the last slide that this is 0.40. So 40%. Lisa's sister has saved 40% of what Lisa has saved.

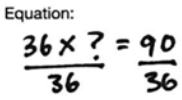
Let's Think (Slide 5): The most important thing is that we must be very careful to identify what quantity is the referent. Because that's the quantity that goes where the whole normally goes in the equation. Look at how the problem below has been changed. Instead of it saying "What percent of Lisa's money does Lisa's sister have?" Now it says, "What percent of Lisa's sister's money does Lisa have?" It is a percent of Lisa's sister's money. So Lisa's sister's money is the referent now and we're comparing Lisa's money to it.



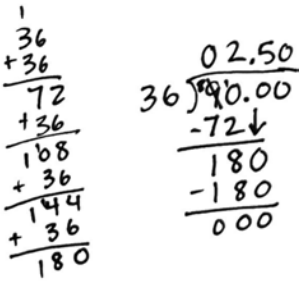
The tape diagram would look the same to start. Lisa has $90. Lisa's sister has saved $36. But now when we draw the percent, it's a percent of Lisa's sister's money so $36 is like the whole total amount. That is where I will put 100%. Lisa's money is going to be more than 100% then. Just like Lisa saved more than what her sister did. I will put the question mark here.



My table will have to look different because now the sister is the referent so I put it like this.



Let's write this as an equation. It is still REFERENT x PERCENT = QUANTITY. But this time the referent is 36 times question mark equal 90. I have to divide by 36 on each side.



Let me write 90 divided by 36 on the side of my paper. I don't know how to multiply or divide 36 so I write the addition on the side of my paper. 36 plus 36 is 72. If I add another 36, I get 108. So that means that 36 goes into 90 two times. I subtract 72 and get 18. I need hundredths for percents. So I will add a decimals and annex two zeros.

I will pull down one zero. Now I need 36 into 180. I will keep adding 36s. 108 plus 36 is 144. 144 plus 36 is 180. Yay! I will count up my 36s. *Point to the 36s that you added as you count them up.* There are 1 - 2 - 3 - 4 - 5! I get 5 and subtract 180. We're done.

Remember that we look in the hundredths place for a percent. So this is 2.50, which means that Lisa saved 250% of what her sister saved. Do you see how powerful percents can be? If you tell me Lisa saved 250% of what her sister saved, I realize that Lisa saved a lot more than her sister.

Let's Try It (Slide 6): Now we will practice some more problems. I will lead you through step by step.

WARM WELCOME

Today we will use percents to compare quantities.

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Let's Review:

We can use a multiplication equation to solve percent problems.

Lisa has saved $90. She is going to spend $36 on a hat. What percent of Lisa's money does she plan to spend?

Tape diagram: Table: Equation:

Let's Talk:

We can also use percents to compare two quantities.

Lisa has saved $90. Her sister has saved $36. What percent of Lisa's money does Lisa's sister have?

Tape diagram: Table: Equation:

Let's Think:

We must be very careful to identify what quantity is the referent.

Lisa has saved $90. Her sister has saved $36. What percent of ~~Lisa's~~ Lisa's sister's money does ~~Lisa's sister~~ Lisa have?

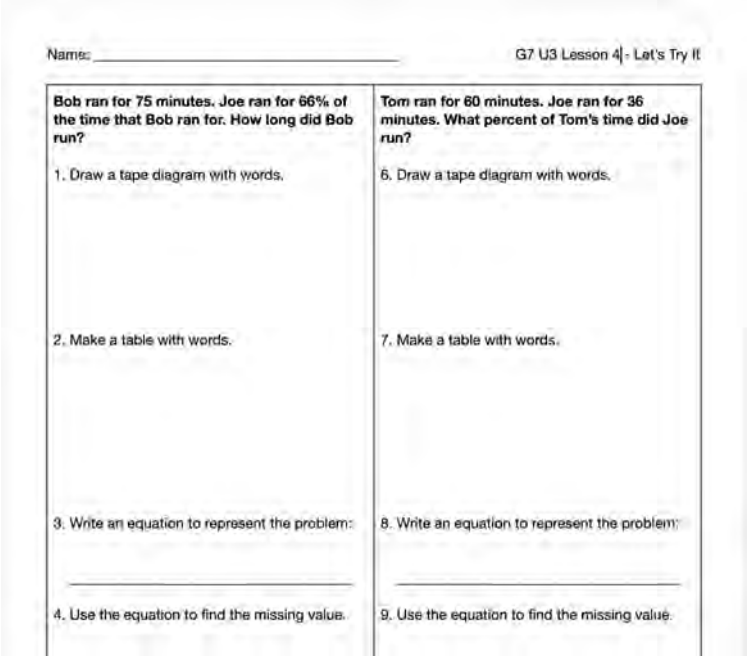
Tape diagram:

Table:

Equation:

Let's Try It:

We will do it together step by step!

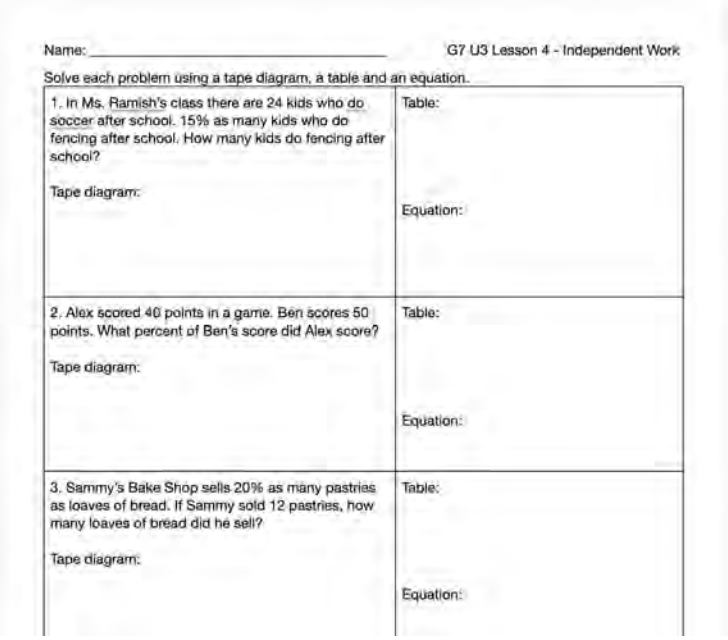


Name: _____ G7 U3 Lesson 4 - Let's Try It

Bob ran for 75 minutes. Joe ran for 66% of the time that Bob ran for. How long did Bob run?	**Tom ran for 60 minutes. Joe ran for 36 minutes. What percent of Tom's time did Joe run?**
1. Draw a tape diagram with words.	6. Draw a tape diagram with words.
2. Make a table with words.	7. Make a table with words.
3. Write an equation to represent the problem: _____	8. Write an equation to represent the problem: _____
4. Use the equation to find the missing value.	9. Use the equation to find the missing value.

On your Own:

Now it's time for you to do it on your own.



Name: _____ G7 U3 Lesson 4 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. In Ms. Ramish's class there are 24 kids who do soccer after school. 15% as many kids who do fencing after school. How many kids do fencing after school? Tape diagram:	Table: Equation:
2. Alex scored 40 points in a game. Ben scores 50 points. What percent of Ben's score did Alex score? Tape diagram:	Table: Equation:
3. Sammy's Bake Shop sells 20% as many pastries as loaves of bread. If Sammy sold 12 pastries, how many loaves of bread did he sell? Tape diagram:	Table: Equation:

Bob ran for 75 minutes. Joe ran for 66% of the time that Bob ran for. How long did Bob run?

1. Draw a tape diagram with words.

2. Make a table with words.

3. Write an equation to represent the problem:

_____

4. Use the equation to find the missing value.

5. Write your answer in a complete sentence.

_____

_____

_____

Tom ran for 60 minutes. Joe ran for 36 minutes. What percent of Tom's time did Joe run?

6. Draw a tape diagram with words.

7. Make a table with words.

8. Write an equation to represent the problem:

_____

9. Use the equation to find the missing value.

10. Write your answer in a complete sentence.

_____

_____

_____

Name: _____ G7 U3 Lesson 4 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. In Ms. Ramish's class there are 24 kids who do soccer after school. 25% as many kids who do fencing after school. How many kids do fencing after school? Tape diagram:	Equation:
2. Alex scored 40 points in a game. Ben scores 50 points. What percent of Ben's score did Alex score? Tape diagram:	Equation:
3. Sammy's Bake Shop sells 20% as many pastries as loaves of bread. If Sammy sold 12 pastries, how many loaves of bread did he sell? Tape diagram:	Equation:
4. Sarah solved 12 math problems. Michael solved 15 math problems. What percent of Sarah's problems did Michael solve? Tape diagram:	Equation:

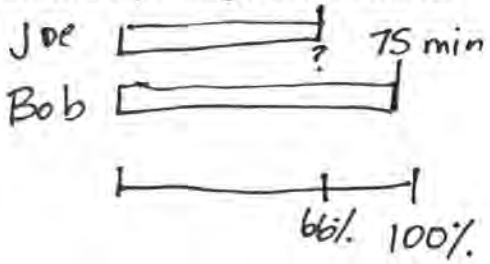
Solve each problem using an equation and a table.

5. A company has 80 employees who work from home. It has 40% as many employees who work in the office. How many employees work in the office? Tape diagram:	Equation:
6. Mary read a 200 page book. Lucy read a 220 page book. What percent of Mary's read did Lucy read? Tape diagram:	Equation:
7. Sadie ran 5 miles. Robbie ran 10 miles. What percent of Robbie's distance did Sadie run? Tape diagram:	Equation:
8. The library has 30 nonfiction series in its collection. This is 10% as many fiction series as it has. How many fiction series must it have in its collection? Tape diagram:	Equation:

Name: ANSWER KEY

Bob ran for 75 minutes. Joe ran for 66% of the time that Bob ran for. How long did Bob run?

1. Draw a tape diagram with words.



2. Make a table with words.

Bob	Joe
75	?
100	66

3. Write an equation to represent the problem:

referent × percent = quantity

4. Use the equation to find the missing value.

$75 \times 0.66 = ?$

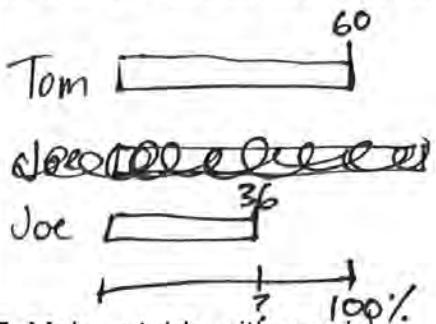
$$\begin{array}{r} 0.66 \\ \times\ 75 \\ \hline 330 \\ 462 \\ \hline 49.50 \end{array}$$

5. Write your answer in a complete sentence.

Bob ran for 49.55 minutes.

Tom ran for 60 minutes. Joe ran for 36 minutes. What percent of Tom's time did Joe run?

6. Draw a tape diagram with words.



7. Make a table with words.

Tom	Joe
60	36
100	?

8. Write an equation to represent the problem:

referent × percent = quantity

9. Use the equation to find the missing value.

$$\frac{60 \times ?}{60} = \frac{36}{60}$$

$$60\overline{)36.00}\quad 0.60,\ -360,\ 000$$

10. Write your answer in a complete sentence.

Joe ran 60% of the time Tom ran.

Name: ANSWER KEY

G7 U3 Lesson 4 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. In Ms. Ramish's class there are 24 kids who do soccer after school. 75% as many kids who do fencing after school. How many kids do fencing after school?

Tape diagram:

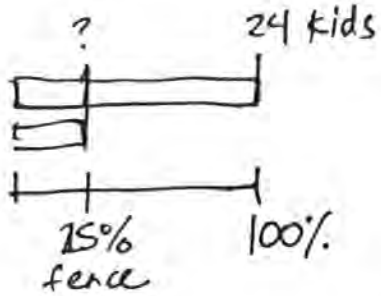


Table:

referent whole	quantity part
24	?
100	75

Equation: $24 \times 0.75 = ?$

$24 \times 0.75 = 6.00$

$\boxed{6}$

2. Alex scored 40 points in a game. Ben scores 50 points. What percent of Ben's score did Alex score?

Tape diagram:

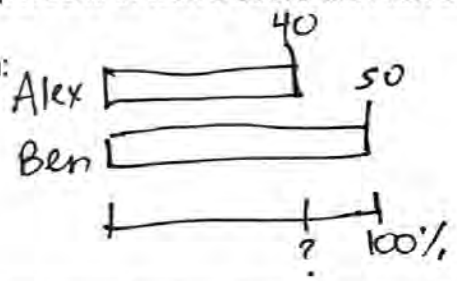


Table:

referent	quantity
50	40
100	?

$50\overline{)40.00}$ -400 000 → 0.80

Equation: $\frac{50 \cdot ?}{50} = \frac{40}{50}$

$\boxed{80\%}$

3. Sammy's Bake Shop sells 20% as many pastries as loaves of bread. If Sammy sold 12 pastries, how many loaves of bread did he sell?

Tape diagram:

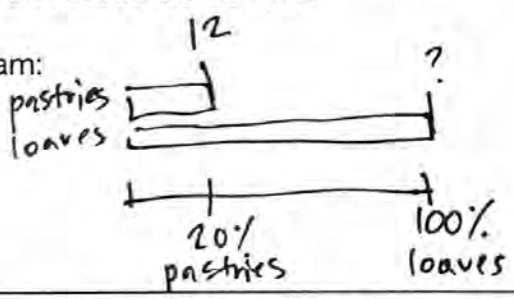


Table:

referent	quantity
?	12
100	20

$0.2\overline{)12.0}$ -12 00 → 60

Equation: $\frac{? \times 0.2}{0.2} = \frac{12}{0.2}$

$\boxed{60 \text{ loaves}}$

4. Sarah solved 12 math problems. Michael solved 15 math problems. What percent of Sarah's problems did Michael solve?

Tape diagram:

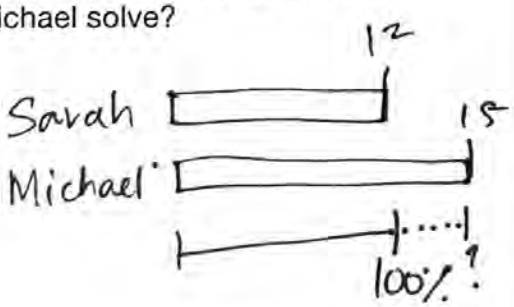


Table:

referent	quantity
12	15
100	?

$12\overline{)15.00}$ -12 30 -24 60 → 1.25

Equation: $\frac{12 \times ?}{12} = \frac{15}{12}$

$\boxed{125\%}$

Solve each problem using an equation and a table.

5. A company has 80 employees who work from home. It has 40% as many employees who work in the office. How many employees work in the office?

Tape diagram:

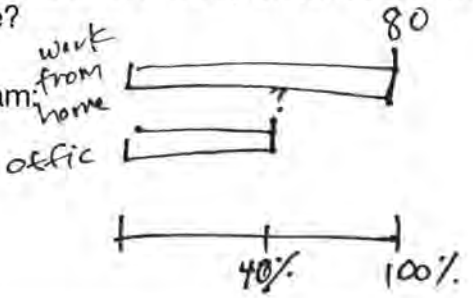


Table:

referent	quantity
80	?
100	40

80 × 0.4 = 32.9

Equation: $80 \times 0.4 = ?$

32 employees

6. Mary read a 200 page book. Lucy read a 220 page book. What percent of Mary's read did Lucy read?

Tape diagram:

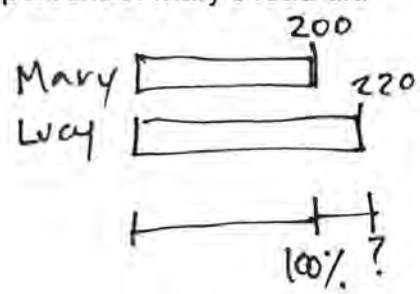


Table:

referent	quantity
200	220
100	?

001.10
200 | 220.00
-200
200
-200

Equation: $\frac{200 \times ?}{200} = \frac{220}{200}$

110%

7. Sadie ran 5 miles. Robbie ran 10 miles. What percent of Robbie's distance did Sadie run?

Tape diagram:

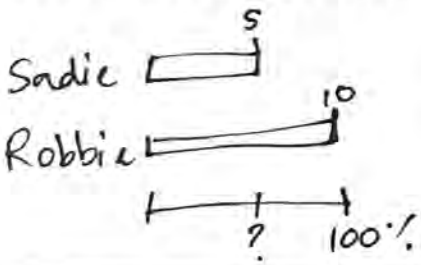


Table:

referent	quantity
10	5
100	?

0.50
10 | 5.00
-50
00

Equation: $\frac{10 \times ?}{10} = \frac{5}{10}$

50%

8. The library has 30 nonfiction series in its collection. This is 10% as many fiction series as it has. How many fiction series must it have in its collection?

Tape diagram:

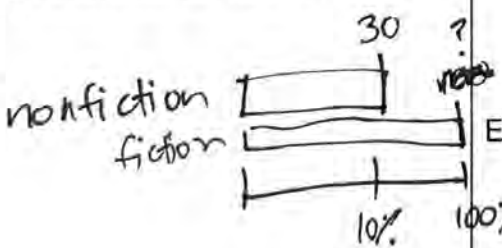


Table:

referent	quantity
?	30
100	10

300
0 | 300
-3
0

Equation: $\frac{? \times 0.1}{0.1} = \frac{30}{0.1}$

300 series

G7 U3 Lesson 5

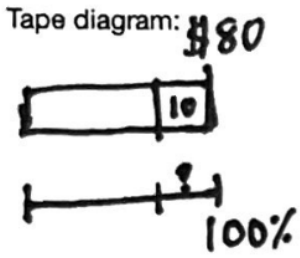
Use decimals to describe increases and decreases Lesson 6 Find percent increases and decreases when given an original amount.

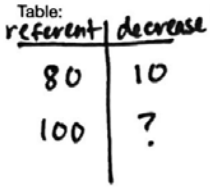
G7 U3 Lesson 5 - Today we will find percent increase and decrease.

Warm Welcome (Slide 1): Tutor choice

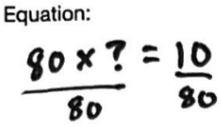
Frame the Learning/Connect to Prior Learning (Slide 2): Today we will find percent increase and decrease. This is a really common way to use percents because people are really familiar with what an amount out of 100 means. 90% is a lot out of 100 and 10% is a lot out of 100. So it's like a kind of shortcut for talking about size. And we really like to talk about the size of an increase, which is something going up. Or the size of a decrease, which is something going down.

Let's Review (Slide 3): We know a table helps us set up our percent equation. It's about to get REALLY important to label your table. You'll see what I mean. Read the problem below silently along with me while I read out loud. "There was a pair of jeans that cost $80. The owner said they would decrease the price by $10. What was the percent decrease in price?" We're going to draw. First thing, the jeans cost $80. I will draw a rectangle and label it $80. Now I am going to right one more really important word and that is "original." I am writing that because all our work about increase and decrease is going to be dependent on the ORIGINAL number we started with, meaning the first number we started with. That number is the referent. It is the foundation of our comparison. It is what all of our increases and decreases and percents REFER to. Back to drawing. The owner said they would decrease the price by $10. $10 is part of the $80. We want to find the percent so we draw the percent line.

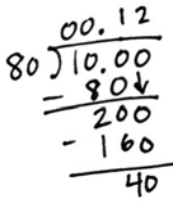




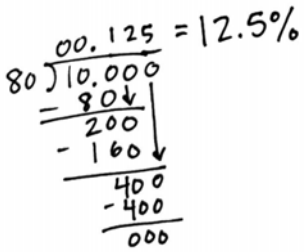
On my table, I know the referent and the decrease. They are $80 and $10. I know 100% is the original price. But I don't know the percent. I don't know the multiplier for my table.



So in my equation, REFERENT x PERCENT = QUANTITY, I get 80 times question mark equals 10. I divide both sides by 80.



10 divided by 80 is zero. So I add a decimal annex two zeros to the hundredths place. 80 goes into 100 one time. I subtract 80 and get 20. Now I pull down a zero. 80 goes into 200 two times. That's 160 so I subtract 160. I get 40. I could keep going if I want to but I see 0.12, which is 12%.

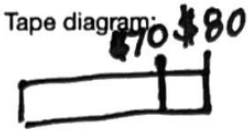


I like these even numbers so let's keep going. I annex one more zero and bring it down so I have 80 into 400. That's five since 8 times 5 is 40. I subtract 400 and have no remainder. Now I see 0.125 so the percent is 12.5%. This is just a more exact answer.

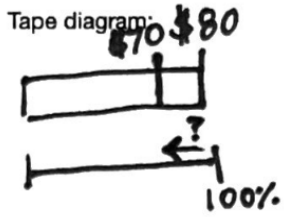
Notice what we did here because it is going to be important for the next problem. We had the referent and the decrease on the table. That's how we found the percent decrease. Now let's see if we can make that kind of table for the next problem.

Let's Talk (Slide 4): This says, "Sometimes there is an extra step to find a percent increase or decrease." And that's what's going to happen here. It's the same story we just read only written a little differently. Read along with me while I read it out loud, "There was a pair of jeans that cost $80. The owner said they would decrease the price to $70. What was the percent decrease in price?"

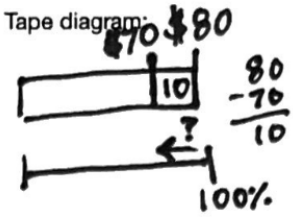
Let's draw first. I have a rectangle labeled $80.

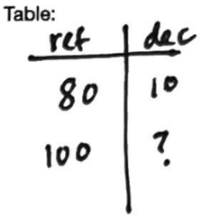


Now the owner said they would decrease the price to $70 so I will draw that in the rectangle. When I go to draw the percent, we have something special. I can mark 100% as the original price, which is the referent. But now I'm not looking for the new percent of the original price. I am looking for the percent decrease. I am looking for the percent that it went down. This is soooo important for me to notice when I read. I am going to put a question mark here on my percent line because I want the percent decrease.



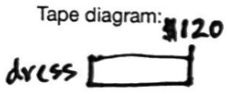
If I try to make a table with referent and decrease this time, I don't have enough information yet. I have 80 as the referent. I have 100% and I want to find the percent. But I don't know the decrease in price. I just know what the new price was. This is the extra step that we said we might have to do. I am going to find a value for the decrease, which is this shaded part. I do 80 minus 70 equals 10. This piece is 10 and NOW I can put the decrease on the table, which is 10.





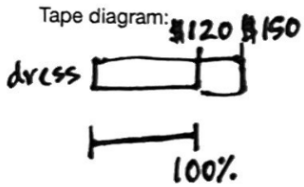
Now this problem is just like the one we just did. It is the same actually, where we would write the equation 80 times question mark equals 10. The big idea is that if we want to find the percent increase or decrease we might have to do an extra step.

Let's Think (Slide 5): It is the same thing for this next slide. Sometimes there is an extra step to find a percent increase or decrease. Read the problem silently along with me while I read out loud. "There was a dress that Amelia really wanted that cost $120. When she went back to the store, they had raised the price to $150. What was the percent increase in price?" Let's draw. First, I have the original price of the dress. Remember, that's my referent. That's the whole that I am basing all my percents on. It is super important that I write the word original here.

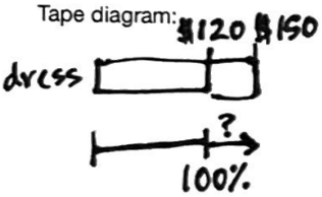


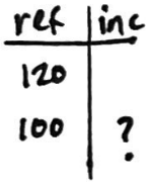
Now, it says, "When she went back to the store, they had raised the price to $150." I am going to have to draw that as the bar getting longer. It is going up to $150. I will even write new so we know that's the new price.

When I go to draw my percent line. The 100% goes to the $120. That's the original amount, the referent.

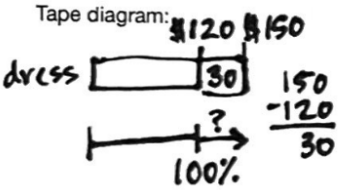


And I want to find the percent increase. So I want to find an imaginary extra amount here.

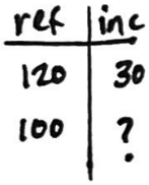




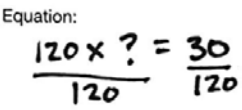
I can already see that the value of this increase is something I'm going to need to know. We can check on our table. I have the referent and the increase columns. The referent is $120. I haven't figured out the increase yet. I only know that 100% corresponds to the referent. And I am trying to find this percent increase.



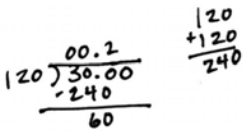
Let's go back and find this part of my picture. In other words, I need to know the actual increase in dollars before I can find the percent increase. That's where that extra step comes in. That is the most important thing. So, I will do 150 minus 120, which is 30.



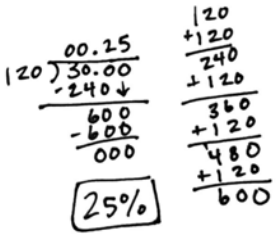
I will write that in the box and in the table.



Now I have what I need to write an equation. It is REFERENT x PERCENT = QUANTITY. I know the referent is 120 x question mark equals 30. To find the percent, I have to divide each side by 120.



Let's do the math over to the side. 30 divided by 120 is zero so I will add a decimal and annex two zeros. I have no idea how to divide by 120 so I will add up some 120's on the side of my paper. 120 plus 120 is 240. I can't add another 120 without going over. That was two 120s so I write a 2 and subtract 240. That leaves 60.



Pull down the zero. I am going to have to add some more 120s. 240 plus 120 is 360. 360 plus 120 is 480. 480 plus 120 is 600. Hooray, that is going to work. Let me count up these 120s. There are five! I will write down the 5 and subtract 600. That leaves zero. My decimal is 0.25 so 25%. There was a 25% increase in the price.

The most important thing is that we aren't going to take short cuts here. When we draw a picture and write a table with words, we can see if there is an extra step and do the math to get the right answer. The equation we need is always the multiplication equation so that's not really the hard part.

Let's Try It (Slide 6): Now we will practice some more problems. I will lead you through step by step.

WARM WELCOME

Today we will find percent increase and decrease.

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Let's Review:

We know a table helps us set up our percent equation.

There was a pair of jeans that cost $80. The owner said they would decrease the price by $10. What was the percent decrease in price?

Tape diagram: Table: Equation:

Let's Talk:

Sometimes there is an extra step to find a percent increase or decrease.

There was a pair of jeans that cost $80. The owner said they would decrease the price to $70. What was the percent decrease in price?

Tape diagram: Table: Equation:

Let's Think:

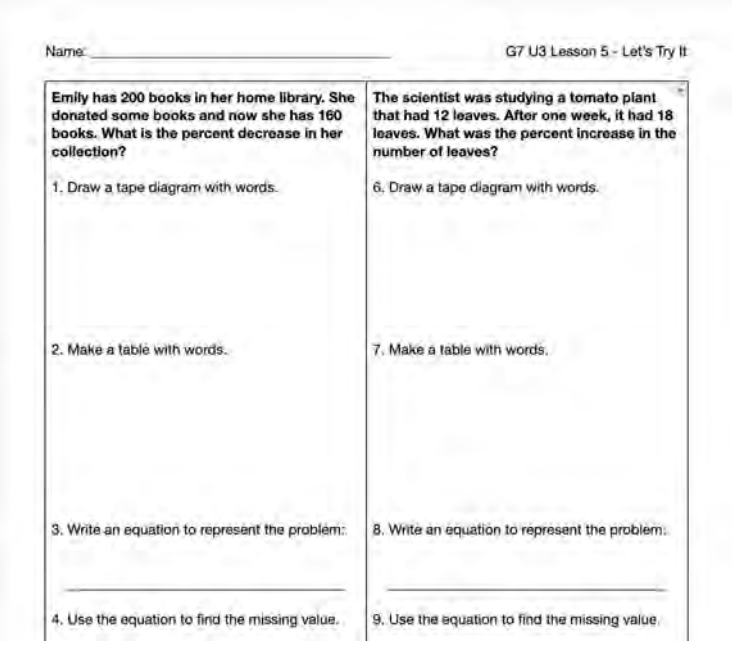
Sometimes there is an extra step to find a percent increase or decrease.

There was a dress that Amelia really wanted that cost $120. When she went back to the store, they had raised the price to $150. What was the percent increase in price?

Tape diagram: Table: Equation:

Let's Try It:

We will do it together step by step!



Name: _____ G7 U3 Lesson 5 - Let's Try It

Emily has 200 books in her home library. She donated some books and now she has 160 books. What is the percent decrease in her collection?	**The scientist was studying a tomato plant that had 12 leaves. After one week, it had 18 leaves. What was the percent increase in the number of leaves?**
1. Draw a tape diagram with words.	6. Draw a tape diagram with words.
2. Make a table with words.	7. Make a table with words.
3. Write an equation to represent the problem: _____	8. Write an equation to represent the problem: _____
4. Use the equation to find the missing value.	9. Use the equation to find the missing value.

On your Own:

Now it's time for you to do it on your own.

Name: _____ G7 U3 Lesson 5 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. A car's original price was 20K. Now it is 16K. What was the percent decrease in the car's price? Tape diagram:	Equation:
2. Today is 64 degrees. Yesterday it was 80 degrees. What was the percent decrease in temperature from yesterday to today? Tape diagram:	Equation:
3. A restaurant had 90 customers on Monday. On Tuesday, they had 120 customers. What was the percent increase in customers? Tape diagram:	Equation:

Emily has 200 books in her home library. She donated some books and now she has 160 books. What is the percent decrease in her collection?

1. Draw a tape diagram with words.

2. Make a table with words.

3. Write an equation to represent the problem:

_____

4. Use the equation to find the missing value.

5. Write your answer in a complete sentence.

_____

_____

_____

The scientist was studying a tomato plant that had 12 leaves. After one week, it had 18 leaves. What was the percent increase in the number of leaves?

6. Draw a tape diagram with words.

7. Make a table with words.

8. Write an equation to represent the problem:

_____

9. Use the equation to find the missing value.

10. Write your answer in a complete sentence.

_____

_____

_____

Name: _____ G7 U3 Lesson 5 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. A car's original price was 20K. Now it is 16K. What was the percent decrease in the car's price? Tape diagram:	Equation:
2. Today is 64 degrees. Yesterday it was 80 degrees. What was the percent decrease in temperature from yesterday to today? Tape diagram:	Equation:
3. A restaurant had 90 customers on Monday. On Tuesday, they had 120 customers. What was the percent increase in customers? Tape diagram:	Equation:
4. A store had 50 apples in stock. It sold 10 apples. What is the percent decrease in stock? Tape diagram:	Equation:

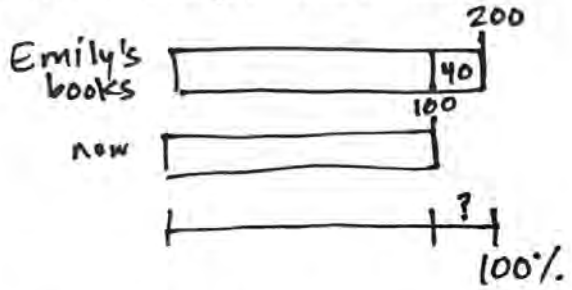
Solve each problem using an equation and a table.

5. Sarah ran 6 miles this week. Last week she ran 5 miles. What is the percent increase in the distance she ran? Tape diagram:	Equation:
6. Sarai had 200 followers on social media. After gaining 50 new followers, what is the percent increase? Tape diagram:	Equation:
7. A store sold 450 items last month. This month, they sold 500 items. What was the percent increase in sales? Tape diagram:	Equation:
8. A student got 40 points on their math test. After retaking the test, they got 44 points. What was the percent increase in their score? Tape diagram:	Equation:

Name: ANSWER KEY

Emily has 200 books in her home library. She donated some books and now she has 160 books. What is the percent decrease in her collection?

1. Draw a tape diagram with words.



2. Make a table with words.

whole	decrease
200	40
100	?

3. Write an equation to represent the problem:

referent × ~~100~~ percent = decrease

4. Use the equation to find the missing value.

$\frac{200 \times ?}{200} = \frac{40}{200}$

$\frac{?}{20}$

$200\overline{)40.00}$ → -400 → 000

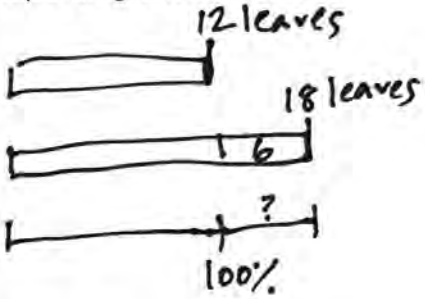
20%

5. Write your answer in a complete sentence.

The percent decrease in her collection was 20%.

The scientist was studying a tomato plant that had 12 leaves. After one week, it had 18 leaves. What was the percent increase in the number of leaves?

6. Draw a tape diagram with words.



7. Make a table with words.

original	new increase
12	6
100	?

8. Write an equation to represent the problem:

referent × percent = decrease

9. Use the equation to find the missing value.

$\frac{12 \times ?}{12} = \frac{6}{12}$

$\frac{?}{12}$

$12\overline{)6.00}$ → -60 → 00

50%

10. Write your answer in a complete sentence.

The percent increase in the leaves was 50%.

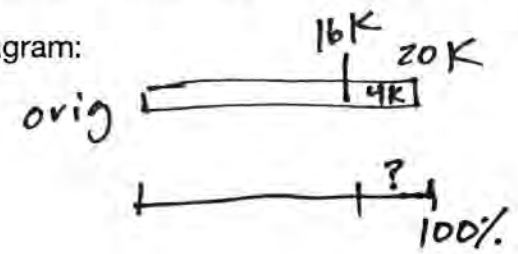
Name: ANSWER KEY

G7 U3 Lesson 5 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. A car's original price was 20K. Now it is 16K. What was the percent decrease in the car's price?

Tape diagram:



Equation:

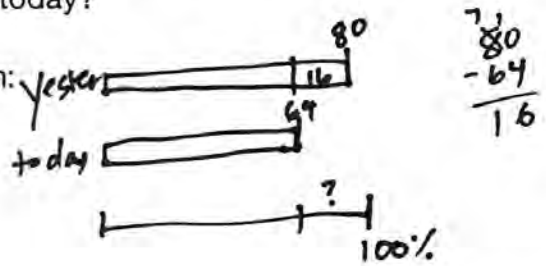
$\frac{20 \times ?}{20} = \frac{4}{20}$

$20\overline{)4.0}$ → 0.20, -40, 00

20%

2. Today is 64 degrees. Yesterday it was 80 degrees. What was the percent decrease in temperature from yesterday to today?

Tape diagram:



$80\overline{)16.0}$ → 0.20, -160

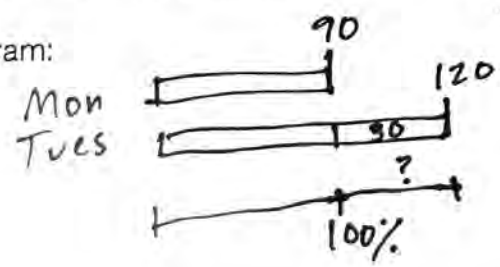
Equation:

$\frac{80 \times ?}{80} = \frac{16}{80}$

20%

3. A restaurant had 90 customers on Monday. On Tuesday, they had 120 customers. What was the percent increase in customers?

Tape diagram:



$90\overline{)30.00}$ → 0.33, 270, 300, -270, 30

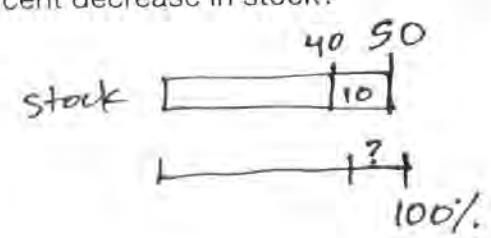
Equation:

$\frac{90 \times ?}{90} = \frac{30}{90}$

33%

4. A store had 50 apples in stock. It sold 10 apples. What is the percent decrease in stock?

Tape diagram:



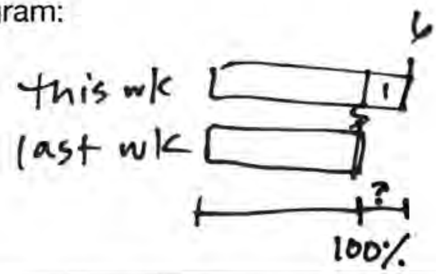
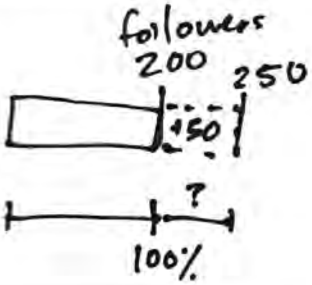
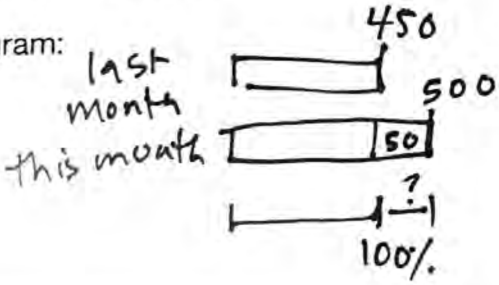
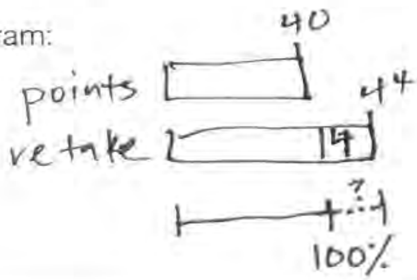
Equation:

$\frac{50 \times ?}{50} = \frac{10}{50}$

$50\overline{)10.00}$ → 0.20, 100, 000

20%

Solve each problem using an equation and a table.

5. Sarah ran 6 miles this week. Last week she ran 5 miles. What is the percent increase in the distance she ran? Tape diagram: 	Equation: $\frac{6 \times ?}{6} = \frac{1}{6}$ $6 \overline{)1.00} = 0.16$; -6; 40; -36 **16%**
6. Sarai had 200 followers on social media. After gaining 50 new followers, what is the percent increase? Tape diagram: 	Equation: $\frac{200 \times ?}{200} = \frac{50}{200}$ $200 \overline{)50.00} = 00.25$; -400; 1000; -1000; 0000 **25%**
7. A store sold 450 items last month. This month, they sold 500 items. What was the percent increase in sales? Tape diagram: 	Equation: $\frac{450 \times ?}{450} = \frac{50}{450}$ $450 \overline{)50.00} = 00.11$; -450; 500; -450; 50 **11%**
8. A student got 40 points on their math test. After retaking the test, they got 44 points. What was the percent increase in their score? Tape diagram: 	Equation: $\frac{40 \times ?}{40} = \frac{4}{40}$ $40 \overline{)4.00} = 0.10$; -40; 00 **10%**

G7 U3 Lesson 6

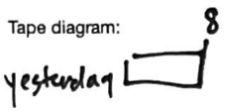
Use double number lines to solve problems about percent increases and decreases.

G7 U3 Lesson 6 - Today we will find the new amount given the percent increase or decrease.

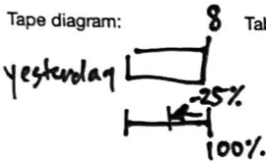
Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we will find the new amount given the percent increase or decrease. We are going to have the same steps that we've always had. We're just going to need to be sure to read the problem very carefully.

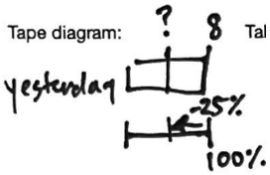
Let's Review (Slide 3): We know how to draw a picture for percent increase or decrease problems.



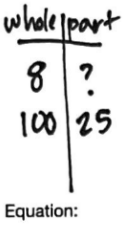
Read this one with me silently while I read it out loud, "Dan worked 8 hours yesterday. Today he worked 25% less. How much did Dan decrease his work?" We start with a picture with words. I am going to draw a bar and label it as 8 hours yesterday.



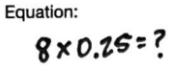
It says he worked 25% less. I will draw a line to represent the percent. I have 100% and I have 25%.



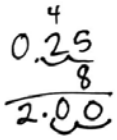
I want to know the part that is 25% here. I am going to mark it as part of the hours from yesterday with a question mark.



I can label a table with whole and part in this case because we have the whole amount he worked and then the part that he worked less. I have 8 hours total and I don't know the part. I have 100% and 25% is the part.



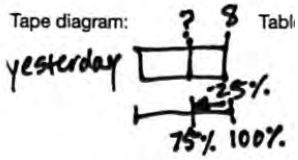
I can see the multiplier because I've been given the percent. It is 0.25. I will write my equation: WHOLE x PERCENT = PART. So 8 x 0.25 = question mark.



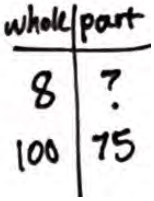
I am going to multiply 8 x 0.25 off to the side. 8 times 5 is 40; I carry the 4. 8 times 2 is 16 plus 4 is 20. I get 200. But I have two decimal places in my problem so I put two decimal places in my answer. My final answer is 2.00 or two.

For my final answer sentence, I can say, "Dan decreased his work by 2 hours." Keep this problem in mind because we are going to change the question and see how it changes our problem.

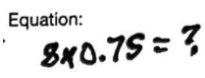
Let's Talk (Slide 4): Here's our new problem. It says at the top, "If the problem is asking for a new quantity after a percent increase or decrease, we will need to add or subtract." Let's see how this goes. Some words are crossed out. Read along with me silently while I read out loud, "Dan worked 8 hours yesterday. Today he worked 25% shorter. How much did Dan work?" Interesting! So now, it doesn't want to know how much Dan decreased his work. But how much he worked - as in, how much did he work after the decrease. A lot of this is the same problem, right? I am still going to find 25% of 8. That was 2 on the last slide. But there's going to be another step. Let's draw a picture to see. I draw a rectangle for the 8 hours. That's the original time, the referent. I want to draw my percent line and I know 100% lines up with the 8 whole hours. But this time, just to show that is decreasing which means going down, I am going to draw an arrow going back this way and label it 25%.



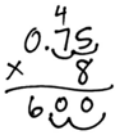
Let's think for a minute. If I am going down 25% from 100, what is going to be left? It will be 75% left. I can mark that here. I could even solve this problem by finding 75% of 8! We can put this on a table now. But remember we had to do that extra step. And the question marks helped us see that.



On my table, I have the whole and the part. I put 8. I don't know the part. But the whole percent is 100% and the part is 75%.



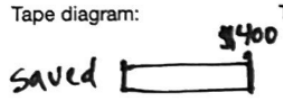
Now I can write an equation. It is whole x percent equals part. 8 x 0.75 equals question mark.

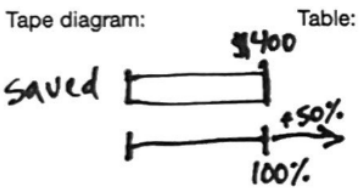


Now I will multiply 8 x 0.75 off to the side. 8 x 5 is 40 and I carry the 4. 8 times 7 is 56 plus 4 is 60. So I get 600. I put in my decimal point for the two place values and I get 6.00 or 6.

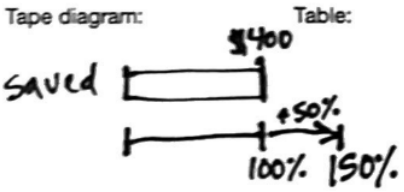
So, here's the big idea… On the last slide, if I just need to know what the percent decrease or increase was, I can just do my regular multiplication equation. But on this slide, if I need to find the NEW final quantity AFTER the increase or decrease, I am going to have an extra step of adding or subtracting to find a new percent before I set up my table or equation.

Let's Think (Slide 5): Let's try another one just to be clear. Remember, "If the problem is asking for a new quantity after a percent increase or decrease, we will need to add or subtract." Read this problem silently along with me while I read it out loud. "Audrey has saved $400. She needs 50% more money to buy her new computer. What must the cost of the new computer be?" Let's draw our diagram with words. I will start with a rectangle that I label $400 saved.

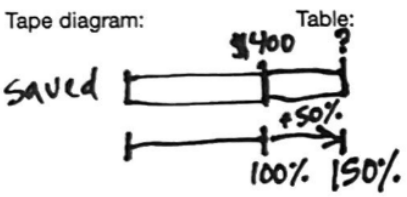




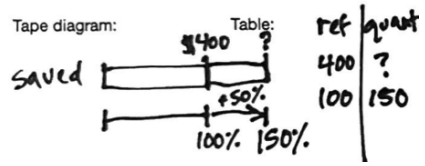
She needs 50% more. Okay, I will start with the 100% line. But now I need 50% more. That means I am going to extend my line. I can draw an arrow and label it 50%.



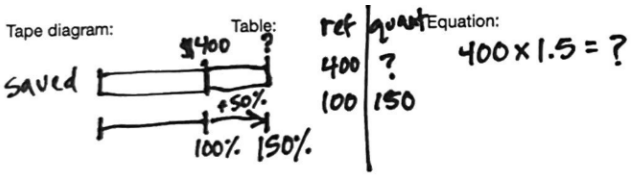
Now, here is where the most important thinking needs to come in. The question is not asking how much more money she needs. It is asking for the final cost. So I need to know the final percent. I will add 100 plus 50 and get 150%.



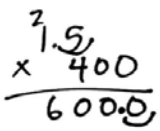
That means that I will be extending my rectangle too. The question is asking for the final price. So I will my question mark here at the end where the final price would be. We can see how that question mark corresponds to 150% not 50%. That's the percent we're going to need to use.



Now I can make a table. This time I don't have a whole and a part. I have my referent and my quantity. 400 is the referent. I'm trying to find the new final quantity. 100% is the referent and 150% is the new final.



I can see that the multiplier will be 1.5. Now I am going to write my equation: REFERENT x PERCENT = QUANTITY so 400 x 1.5 equals question mark.



Let's multiply 400 x 1.5 on the side. I'm just going to do 1.5 x 4 and pop the two zeros back on later. 4 x 5 is 20 and I carry the 2. Then 4 x 1 is 4 plus 2 is 6. That's 60 with two more zeros is 6000. But now I need my decimal which is one place value over. So my final answer is 600.0 or six hundred. That makes sense as a final answer because she is going to save more money.

Let's Try It (Slide 6): Now we will practice some more problems. I will lead you through step by step.

WARM WELCOME

Today we will find the new amount given the percent increase or decrease.

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Let's Review:

We know how to draw a picture for percent increase or decrease problems.

Dan worked 8 hours yesterday. Today he worked 25% less. How much did Dan decrease his work?

Tape diagram: Table: Equation:

Let's Talk:

If the problem is asking for a new quantity after a percent increase or decrease, we will need to add or subtract.

Dan worked 8 hours yesterday. Today he worked 25% shorter. How much did Dan ~~decrease his~~ work?

Tape diagram: Table: Equation:

Let's Think:

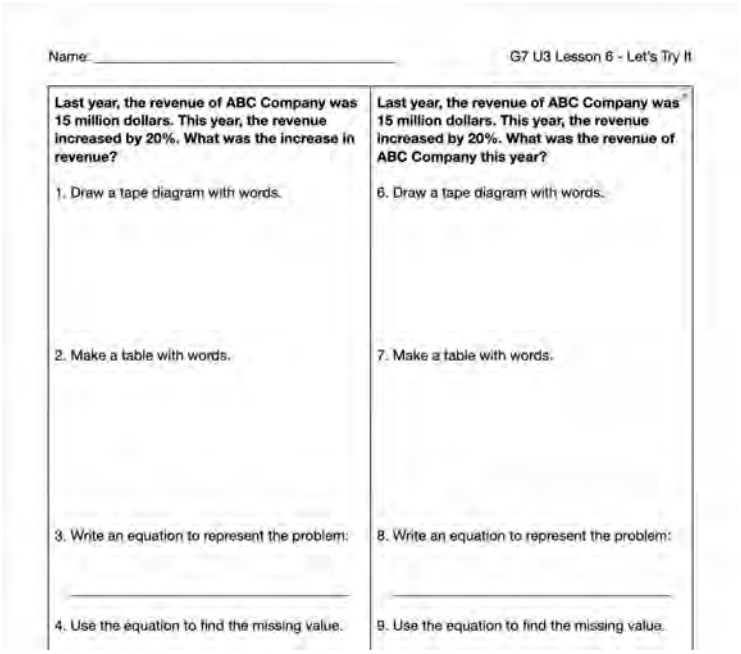
If the problem is asking for a new quantity after a percent increase or decrease, we will need to add or subtract.

Audrey has saved $400. She needs 50% more money to buy her new computer. What must the cost of the new computer be?

Tape diagram: Table: Equation:

Let's Try It:

We will do it together step by step!



Name: _____ G7 U3 Lesson 6 - Let's Try It

Last year, the revenue of ABC Company was 15 million dollars. This year, the revenue increased by 20%. What was the increase in revenue?	**Last year, the revenue of ABC Company was 15 million dollars. This year, the revenue increased by 20%. What was the revenue of ABC Company this year?**
1. Draw a tape diagram with words.	6. Draw a tape diagram with words.
2. Make a table with words.	7. Make a table with words.
3. Write an equation to represent the problem: _____	8. Write an equation to represent the problem: _____
4. Use the equation to find the missing value.	9. Use the equation to find the missing value.

On your Own:

Now it's time for you to do it on your own.

Name: _____ G7 U3 Lesson 6 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. The price of a laptop was $800. After a 15% discount, what was the new price? Tape diagram:	Equation:
2. Sarah saved $200 in January. In February she saved 25% less. How much less money did she save in February than January? Tape diagram:	Equation:
3. Tom drank 5 cups of water yesterday. Today he drank 60% more water. How many cups of water did Tom drink today? Tape diagram:	Equation:

Last year, the revenue of ABC Company was 15 million dollars. This year, the revenue increased by 20%. What was the increase in revenue?

1. Draw a tape diagram with words.

2. Make a table with words.

3. Write an equation to represent the problem:

_____

4. Use the equation to find the missing value.

5. Write your answer in a complete sentence.

_____

_____

_____

Last year, the revenue of ABC Company was 15 million dollars. This year, the revenue increased by 20%. What was the revenue of ABC Company this year?

6. Draw a tape diagram with words.

7. Make a table with words.

8. Write an equation to represent the problem:

_____

9. Use the equation to find the missing value.

10. Write your answer in a complete sentence.

_____

_____

_____

Name: _____ G7 U3 Lesson 6 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

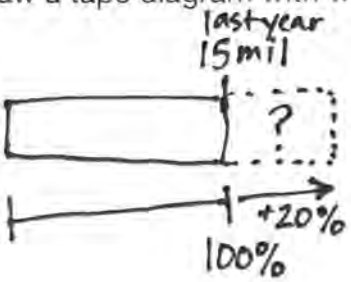
1. The price of a laptop was $800. After a 15% discount, what was the new price? Tape diagram:	Equation:
2. Sarah saved $200 in January. In February she saved 25% less. How much less money did she save in February than January? Tape diagram:	Equation:
3. Tom drank 5 cups of water yesterday. Today he drank 60% more water. How many cups of water did Tom drink today? Tape diagram:	Equation:
4. When Georgio first learned to type, he could type 90 words per minute. Now he can type 120 words per minute. What is the percent increase in Georgio's typing speed? Tape diagram:	Equation:

Solve each problem using an equation and a table.

5. The price of a concert ticket was $50. After a 10% service fee, what was the final price of the ticket? Tape diagram:	Equation:
6. Emily usually uses 4 cups of sugar in her cookie recipe. But now she has decided to increase the sugar by 25%. How much extra sugar is Emily going to add to her recipe? Tape diagram:	Equation:
7. So far, the Jones family has driven 200 miles on their road trip. Tomorrow, they will drive 20% farther. What is the total distance they will have driven by the end of the day tomorrow? Tape diagram:	Equation:
8. Last week, Lisa used her cell phone for 12 hours. This week, her usage was down 25%. How many hours was she on her cell this week? Tape diagram:	Equation:

Last year, the revenue of ABC Company was 15 million dollars. This year, the revenue increased by 20%. What was the increase in revenue?

1. Draw a tape diagram with words.



2. Make a table with words.

original	increase
15	?
100	20

3. Write an equation to represent the problem:

original × percent increase = increase

4. Use the equation to find the missing value.

$15 \times 0.2 = ?$

$3.0 = ?$

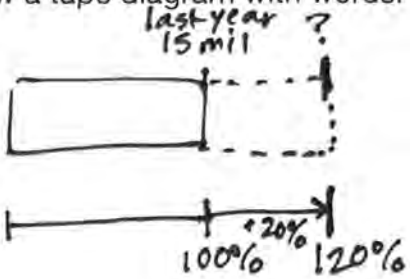
15
×0.2
3.0

5. Write your answer in a complete sentence.

The revenue increased by 3 million dollars.

Last year, the revenue of ABC Company was 15 million dollars. This year, the revenue increased by 20%. What was the revenue of ABC Company this year?

6. Draw a tape diagram with words.



7. Make a table with words.

original	new
15	?
100	120

8. Write an equation to represent the problem:

original × percent = new

9. Use the equation to find the missing value.

$15 \times 1.2 = ?$

15
×1.2
30
150
18.0

10. Write your answer in a complete sentence.

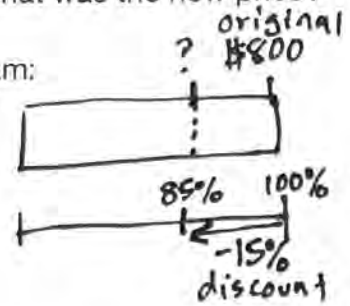
The new revenue was 18 million dollars.

Name: ANSWER KEY There are two possible approaches for each problem but the final answer is the same.

Solve each problem using a tape diagram, a table and an equation.

1. The price of a laptop was $800. After a 15% discount, what was the new price?

Tape diagram:



$$\begin{array}{r} {}^{0}\cancel{1}{}^{9}\cancel{0}0 \\ -\ 15 \\ \hline 85 \end{array}$$

Equation:

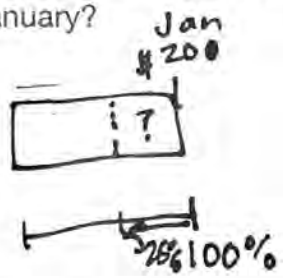
$800 \times 0.85 = ?$

$$\begin{array}{r} {}^{4} \\ 0.85 \\ \times\ 800 \\ \hline 680.00 \end{array}$$

$680

2. Sarah saved $200 in January. In February she saved 25% less. How much less money did she save in February than January?

Tape diagram:



Equation:

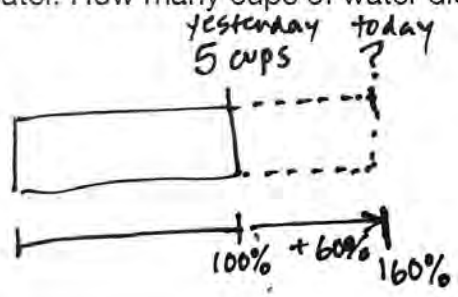
$200 \times 0.25 = ?$

$$\begin{array}{r} 0.25 \\ \times\ 200 \\ \hline 50.00 \end{array}$$

$50

3. Tom drank 5 cups of water yesterday. Today he drank 60% more water. How many cups of water did Tom drink today?

Tape diagram:



Equation:

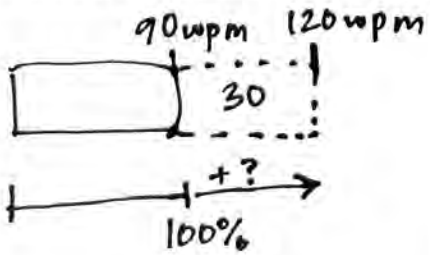
$5 \times 1.6 = ?$

$$\begin{array}{r} {}^{3}1.6 \\ \times\ 5 \\ \hline 8.0 \end{array}$$

8 cups

4. When Georgio first learned to type, he could type 90 words per minute. Now he can type 120 words per minute. What is the percent increase in Georgio's typing speed?

Tape diagram:



$$\begin{array}{r} {}^{0}\cancel{1}{}^{1}\cancel{2}0 \\ -\ 90 \\ \hline 30 \end{array}$$

Equation:

$$\frac{90 \times ?}{90} = \frac{30}{90}$$

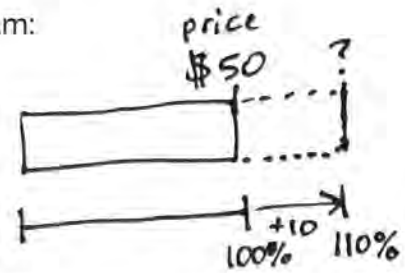
$$\begin{array}{r} 0.33 \\ 90\overline{)30.00} \\ 270 \\ \hline 300 \\ -270 \end{array}$$

33%

Solve each problem using an equation and a table.

5. The price of a concert ticket was $50. After a 10% service fee, what was the final price of the ticket?

Tape diagram:



Equation:

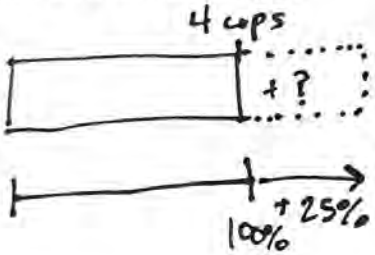
$50 \times 1.1 = ?$

$55

1.1
× 50
55.0

6. Emily usually uses 4 cups of sugar in her cookie recipe. But now she has decided to increase the sugar by 25%. How much extra sugar is Emily going to add to her recipe?

Tape diagram:



Equation:

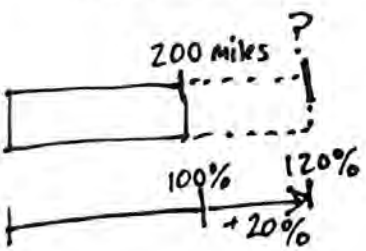
$4 \times 0.25 = ?$

1 cup

0.25
× 4
1.00

7. So far, the Jones family has driven 200 miles on their road trip. Tomorrow, they will drive 20% farther. What is the total distance they will have driven by the end of the day tomorrow?

Tape diagram:



Equation:

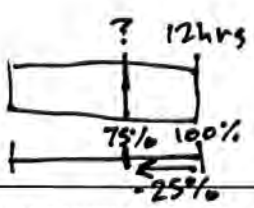
$200 \times 1.2 = ?$

240 miles

1.2
× 200
240.0

8. Last week, Lisa used her cell phone for 12 hours. This week, her usage was down 25%. How many hours was she on her cell this week?

Tape diagram:



Equation:

$12 \times 0.75 = ?$

9 hours

12
× 0.75
60
+ 840
9.00

G7 U3 Lesson 7

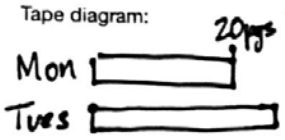
Use equations to represent percent increases and decreases.

G7 U3 Lesson 7 - Today we will find the original amount given the percent increase or decrease.

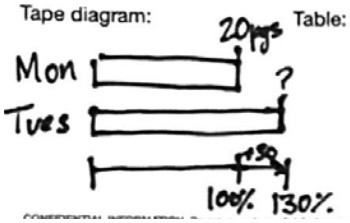
Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we will find the original amount given the percent increase or decrease.

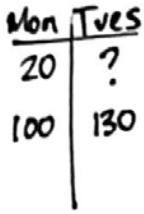
Let's Review (Slide 3): We know how to find a new amount when we are given the percent change. Read the story silently with me while I read it out loud, "Lelac wrote 20 pages of her novel on Monday. The next day, she was able to write 30% more than she did the day before. How much did Lelac write on Tuesday?" I am going to draw a rectangle and call it 20 pages and write Monday.



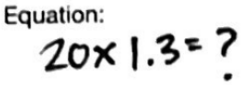
It says the next day she wrote 30% more. I don't know how many pages that is but I can draw a rectangle and put a question mark to find out how much it is. I will write Tuesday.



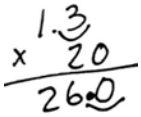
I also need to draw my percent line. 100% is the original amount on Monday and then this extra amount is 30% so I will draw an arrow showing a 30% increase.



I can either find out what 30% is and add it or find 130%. Let's do it that way today. In my table, I will have Monday and Tuesday. 20 pages is Monday. I don't know Tuesday. But for percentages, I have 100% and 130%.



I can see my multiplier must be x1.30 because I turn 130% into a decimal. Now my equation is clear: REFERENT x PERCENT = QUANTITY so 20 x 1.3 equals question mark.



Let's do the math to the side. I will do 1.3 x 2. 2 times 3 is 6. 2 times 1 is 2. I need to put that zero back on. So I get 260. But now I need to put that decimal point in there with one space so my final answer is 26.0 or twenty six.

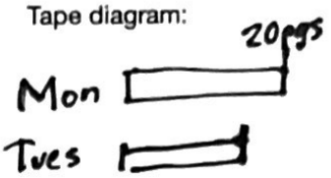
On this slide, we were given the original amount and we had to find the new amount. Now let's think about what we should do if we were given the new amount and we had to find the original amount.

Let's Talk (Slide 4): We can imagine that to find the original amount, we will need to work backwards. It's kind of like we are doing the opposite of the slide we just did. This can maybe feel confusing. We might worry, "When do we go forward and when do we go backwards?" The good news is that as long as we are using labels to keep the numbers organized then when we plug them into the equation with a question, it will be easier to see what number crunching to do. Let's try this example. The problem might sound the same but it will be different. Read along silently with me while I read out loud, "Lelac wrote 20 pages of her novel on Monday. This was up 25% from the day before. How

Tape diagram:

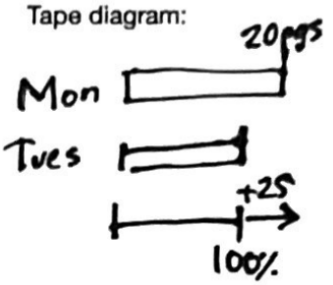
much did Lelac write on Sunday?" Let's draw! I am going to make a rectangle and label it 20 pages for Monday.

Tape diagram:



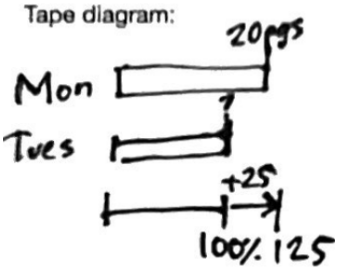
It is says, "This was up 25% from the day before." So, this rectangle is 25% higher than the day before. I will draw a smaller rectangle and label it the day before.

Tape diagram:



I need a percent line and here's where it gets tricky. It said Monday was 25% up. That means it's up from 100%. So I'm not going to draw a line for 100% up to Monday's total. I am going to draw a line for 100% up to the day before. Then I can draw an arrow to show, it goes 25% up. This requires super careful reading. "This was up" makes me think, "What was up?" And I have to remember that I had just read about Monday. So Monday was up from another day. Monday isn't the referent. Monday is the new amount. The day before is the referent. The day before is the original amount.

Tape diagram:



So, if I am going to make a table, I have to choose what bits I want to solve for but it's probably easiest to just put Sunday and Monday. I don't know Sunday's amount. I know Monday was 20 pages. I know Sunday was the 100%. Monday's is not 25%. It's 25% UP from 100%. So I have to put 125%. Remember that there's always at least two steps with percent increase problems and here was one of those steps.

Table:

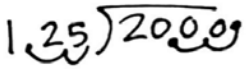
Tues	Mon
?	20
100	125

I will put Tuesday and Monday on the table with the percents.

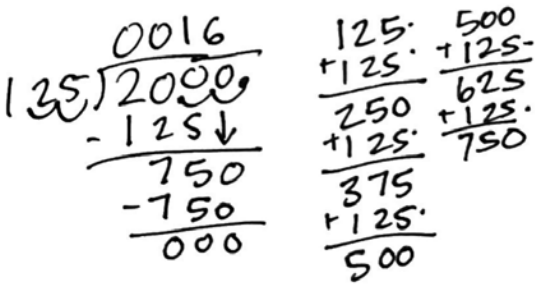
Equation:

$$\frac{?}{1.25} \times 1.25 = \frac{20}{1.25}$$

Now I have what I need to write the equation. The multiplier is x 1.25 because that's turning the percent to a decimal. Now I can write REFERENT X PERCENT = QUANTITY and this time it is question mark times 1.25 equals 20. Now this is interesting! Now I can see that we can't just multiply like we have been because it is not clear what to multiply by. Now in the setup of the equation itself, the working backwards that we need to do is obvious. I am going to divide by 1.25 on each side.

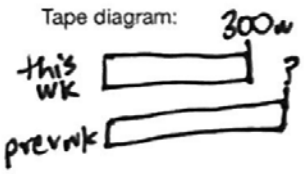


Let's write out this division in a separate place. I have 20 divided by 1.25. I can't divide by a decimal very easily so I will shift the decimal two places to the right of my divisor and my dividend. Now it is 2000 divided by 125.

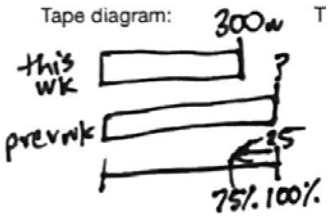


125 doesn't go into 2 so I'll put a zero. It doesn't go into 20 so I'll put a zero. It goes into 200, one time. I subtract 125 and get 75. I pull down a zero and get 750. This is pretty big to divide so I will add up some 125s on the side of my paper. 125 plus 125 is 250. 250 plus 125 is 375. 375 plus 125 is 500. 500 plus 125 is 625. 625 plus 125 is 750. That's as high as we need to go. Let's count all those 125s. *Point as you count them up.* 1 - 2 - 3 - 4 - 5 - 6! I write 6 and subtract 750. There's none left and I have my answer - 16!

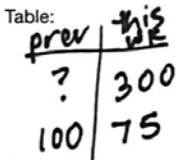
Let's look back at our drawing and see if that makes sense. If Lelac was up 25% from the day before, might she have read 16 the day before? Sounds reasonable!



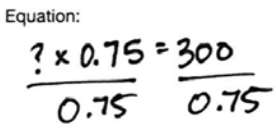
Let's Think (Slide 5): These ideas can apply to percent decrease as well. Read along with me silently while I read out loud. "The widget machine pumped out 300 widgets per hour this week. That is down 25% from the previous week. How many widgets must it have pumped out last week?" Let's draw! I am going to make a rectangle and call it 300 widgets this week.



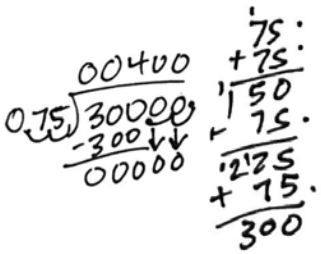
It says, "That is down 25% from the previous week." So this rectangle is down from another rectangle. That means I need to draw a bigger rectangle for it to be down from and label it "last week." To be 25% down, that means there needs to be a 100% to be down from. So I have to draw that here and then I can draw in my 25% down from there. I want to figure out this percent. So I do 100 - 25 is 75. And now I have the information I need for my table and equation.



I am going to put "previous week" for the 1st column and "this week" in the next column. I don't know this previous week. I know this week is 300. The previous week is the 100% and this week is 75%.



I can see my multiplier will be x0.75. I am going to set up my equation. REFERENT x PERCENT = QUANTITY. When I substitute, I get question mark times 0.75 equals 300. And I can work backwards to solve by dividing each side by 0.75.



Let's write that division off to the side. 300 divided by 0.75. I can't divide by a decimal so I shift it for both numbers and it becomes 30000 divided by 75. 75 doesn't go into 3 so I put a zero. 75 doesn't got into 30 so I put a zero. To find how many times it goes into 300, I am going to add on the side of my paper. 75 + 75 is 150. 150 plus 75 is 225. 225 plus 75 is 300. That's our answer. Let's count up the 75s. I see four of them. So I put 4 in my division. I subtract 300. I have zero left. But I can't just stop at 4. There is zero in the next place and zero in the next place and my answer is 400. We want to look back in our picture and think about the story to see if that makes sense. It said the 300 widgets is down from the previous week. 300 is down from 400 so that seems reasonable. Great work!

Let's Try It (Slide 6): Now we will practice some more problems. I will lead you through step by step.

WARM WELCOME

Today we will find the original amount given the percent increase or decrease.

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Let's Review:

We know how to find a new amount when we are given the percent change.

Lelac wrote 20 pages of her novel on Monday. The next day, she was able to write 30% more than she did the day before. How much did Lelac write on Tuesday?

Tape diagram: Table: Equation:

Let's Talk:

We can imagine that to find the original amount, we will need to work backwards.

Lelac wrote 20 pages of her novel on Monday. This was up 25% from the day before. How much did Lelac write on Sunday?

Tape diagram: Table: Equation:

Let's Think:

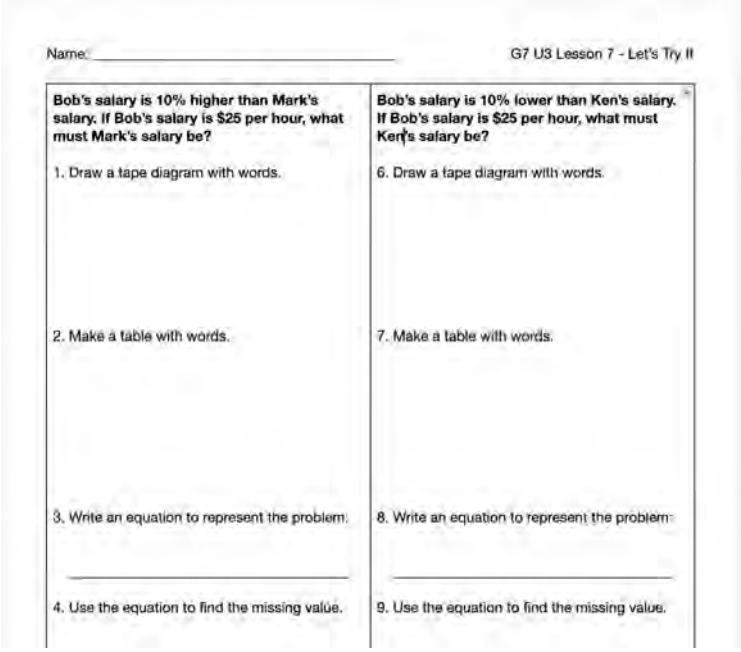
These ideas can apply to percent decrease as well.

The widget machine pumped out 300 widgets per hour this week. That is down 25% from the previous week. How many widgets must it have pumped out last week?

Tape diagram: Table: Equation:

Let's Try It:

We will do it together step by step!



Name: _____ G7 U3 Lesson 7 - Let's Try It

Bob's salary is 10% higher than Mark's salary. If Bob's salary is $25 per hour, what must Mark's salary be?	**Bob's salary is 10% lower than Ken's salary. If Bob's salary is $25 per hour, what must Ken's salary be?**
1. Draw a tape diagram with words.	6. Draw a tape diagram with words.
2. Make a table with words.	7. Make a table with words.
3. Write an equation to represent the problem.	8. Write an equation to represent the problem.
4. Use the equation to find the missing value.	9. Use the equation to find the missing value.

On your Own:

Now it's time for you to do it on your own.

Name: _____ G7 U3 Lesson 7 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. The height of a tree was 25% higher than its height the previous year. If the tree is 30 feet tall, how tall was it in the previous year? Tape diagram:	Equation:
2. Jennifer picked 15% more apples today than yesterday. If she picked 100 apples yesterday, how many did she pick today? Tape diagram:	Equation:
3. The shirt is on sale for $25. The price was decreased 50% from the original price. What was the original price? Tape diagram:	Equation:

Bob's salary is 10% higher than Mark's salary. If Bob's salary is $25 per hour, what must Mark's salary be?

1. Draw a tape diagram with words.

2. Make a table with words.

3. Write an equation to represent the problem:

_____

4. Use the equation to find the missing value.

5. Write your answer in a complete sentence.

_____

_____

_____

Bob's salary is 10% lower than Ken's salary. If Bob's salary is $25 per hour, what must Ken's salary be?

6. Draw a tape diagram with words.

7. Make a table with words.

8. Write an equation to represent the problem:

_____

9. Use the equation to find the missing value.

10. Write your answer in a complete sentence.

_____

_____

_____

Name: _____ G7 U3 Lesson 7 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. The height of a tree was 25% higher than its height the previous year. If the tree is 30 feet tall, how tall was it in the previous year? Tape diagram:	Equation:
2. Jennifer picked 15% more apples today than yesterday. If she picked 100 apples yesterday, how many did she pick today? Tape diagram:	Equation:
3. The shirt is on sale for $25. The price was decreased 50% from the original price. What was the original price? Tape diagram:	Equation:
4. Lisa got 30 mosquito bites last week. After she sprayed her garden this week, the bites decreased 10%. How many fewer bites did Lisa get this week than last week? Tape diagram:	Equation:

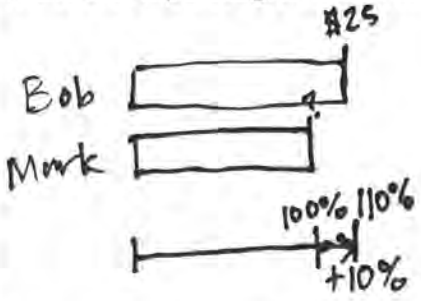
Solve each problem using an equation and a table.

5. The choir director is expecting 50% as many people to attend this year's concert as last year's concert. If she is expecting 150 people, how many people attended last year? Tape diagram:	Equation:
6. The choir director is expecting 50% more people to attend this year's concert as last year's concert. If she is expecting 150 people, how many people attended last year? Tape diagram:	Equation:
7. Emily baked 40 cupcakes for the school bake sale last year. They sold out so fast that she has decided to bake 50% more this year. How many additional cupcakes is Emily planning to bake? Tape diagram:	Equation:
8. Emily baked 40 cupcakes for the school bake sale last year. They sold out so fast that she has decided to bake 50% more this year. How many cupcakes is Emily planning to bake? Tape diagram:	Equation:

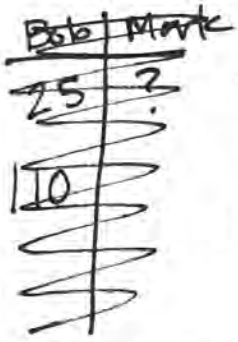
Name: ANSWER KEY

Bob's salary is 10% higher than Mark's salary. If Bob's salary is $25 per hour, what must Mark's salary be?

1. Draw a tape diagram with words.



2. Make a table with words.



Mark	Bob
?	25
100	110

3. Write an equation to represent the problem:

Referent × percent = Quantity

4. Use the equation to find the missing value.

$\frac{? \times 1.1}{1.1} = \frac{25}{1.1}$

$22.72

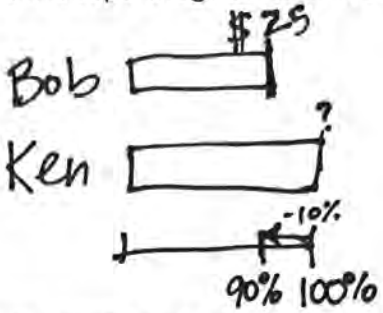
22.72
1.1) 25.00
-22
30
-22
80
-77
3

5. Write your answer in a complete sentence.

Mark's salary must be $22.72

Bob's salary is 10% lower than Ken's salary. If Bob's salary is $25 per hour, what must Ken's salary be?

6. Draw a tape diagram with words.



7. Make a table with words.

Ken	Bob
?	25
100	90

8. Write an equation to represent the problem:

Referent × percent = Quantity

9. Use the equation to find the missing value.

$\frac{? \times 0.9}{0.9} = \frac{25}{0.9}$

$27.77

27.77
0.9) 25.00
-18
70
63
70
-63
7

10. Write your answer in a complete sentence.

Ken's salary must be $27.77

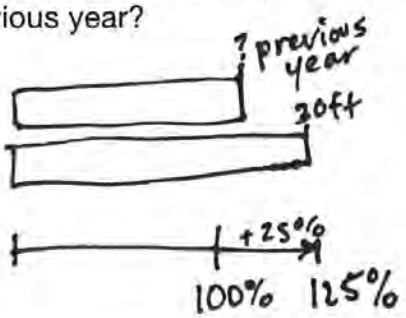
Name: ANSWER KEY

G7 U3 Lesson 7 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. The height of a tree was 25% higher than its height the previous year. If the tree is 30 feet tall, how tall was it in the previous year?

Tape diagram:



Equation:

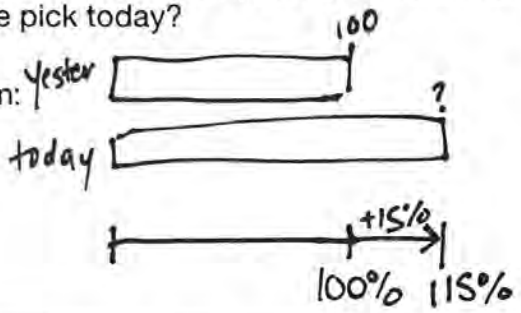
$\frac{? \times 1.25}{1.25} = \frac{30}{1.25}$

0024
1.25) 30.00
-250
500
-500
000

24 feet

2. Jennifer picked 15% more apples today than yesterday. If she picked 100 apples yesterday, how many did she pick today?

Tape diagram:



Equation:

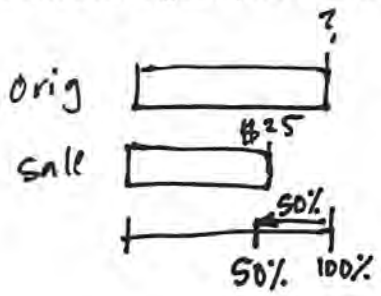
$100 \times 1.15 = ?$

1.15
× 100
1500

115 apples

3. The shirt is on sale for $25. The price was decreased 50% from the original price. What was the original price?

Tape diagram:



Equation:

$\frac{? \times 0.5}{0.5} = \frac{25}{0.5}$

050
0.5) 25.0
-25
00

$50

4. Lisa got 30 mosquito bites last week. After she sprayed her garden this week, the bites decreased 10%. How many fewer bites did Lisa get this week than last week?

Tape diagram:

Equation:

$30 \times .9 = ?$

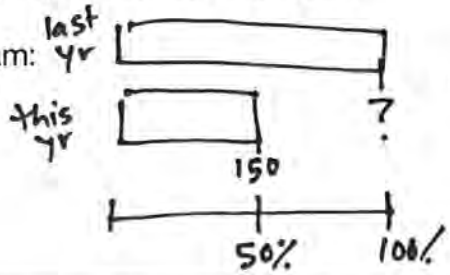
30
× .9
27.0

27 bites

Solve each problem using an equation and a table.

5. The choir director is expecting 50% as many people to attend this year's concert as last year's concert. If she is expecting 150 people, how many people attended last year?

Tape diagram:



Equation:

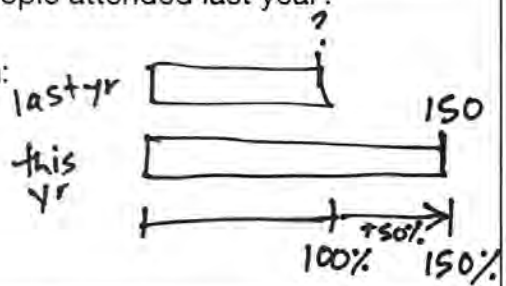
$\frac{? \times 0.5}{0.5} = \frac{150}{0.5}$

0300
0.5 | 150.0
-15
00

300 people

6. The choir director is expecting 50% more people to attend this year's concert as last year's concert. If she is expecting 150 people, how many people attended last year?

Tape diagram:



Equation:

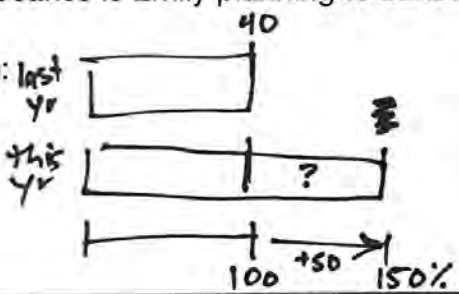
$\frac{? \times 1.5}{1.5} = \frac{150}{1.5}$

0100
1.5 | 150.0
-15
00

100 people

7. Emily baked 40 cupcakes for the school bake sale last year. They sold out so fast that she has decided to bake 50% more this year. How many additional cupcakes is Emily planning to bake?

Tape diagram:



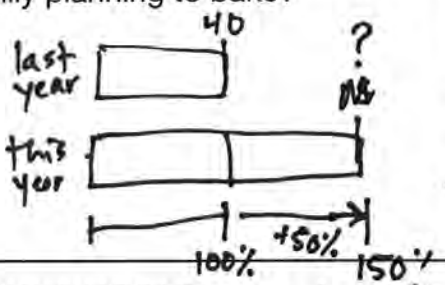
Equation: $40 \times 0.5 = ?$

40
×0.5
20.0

20 more cupcakes

8. Emily baked 40 cupcakes for the school bake sale last year. They sold out so fast that she has decided to bake 50% more this year. How many cupcakes is Emily planning to bake?

Tape diagram:



Equation: $40 \times 1.5 = ?$

40
×1.5
200
400
600

60 cupcakes

G7 U3 Lesson 8

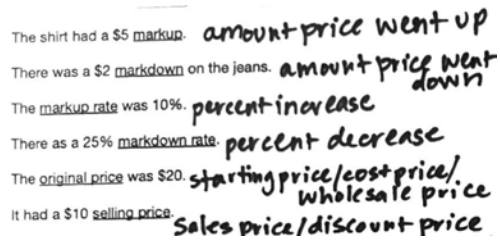
Find percentages of quantities that are not whole numbers.

G7 U3 Lesson 8 - Today we will solve markup and markdown problems.

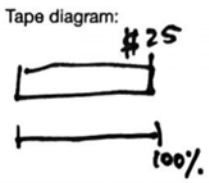
Warm Welcome (Slide 1): Tutor choice

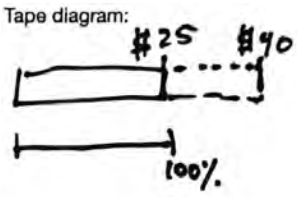
Frame the Learning/Connect to Prior Learning (Slide 2): Today we will solve markup and markdown problems. You are going to be great at this!

Let's Review (Slide 3): The first thing to know is that there are a lot of special words for buying and selling. You all have seen buying and selling so these should be kind of familiar. But let's spell it out. The first word to know is mark up as in "The shirt had a $5 markup." The markup is the amount the price went up. The next word to know is markdown as in "There was a $2 markdown on the jeans." The markdown is the amount the price went down. Another word you might hear is "discount" or "dollars off." The next word to know is markup rate as in "The markup rate was 10%." Since this is a rate, it is represented with a percent. And in this case, it is a percent increase. The next word to know is markdown rate as in "There was a 25% markdown rate." Since this is a rate, it is represented with a percent. And in this case, it is a percent decrease. Sometimes this is called the "discount rate." The next word to know is original price as in "The original price was $20." The original price is the starting price. This is always going to be our referent or the thing we're finding the percent of. Sometimes this will be called the "cost price" or the "wholesale price." And finally, we need to know the meaning of selling price as in "It had a $10 selling price." Sometimes this is called the "sales price" or "discount price." Now let's look at these words in some problems.

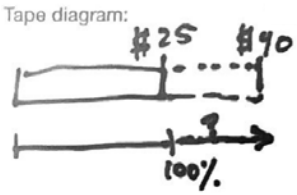


Let's Talk (Slide 4): Markup and markdown problems are just percent change problems. Read this problem silently with me while I read it out loud, "John had a bookbag that he was going to sell for $25. But then everyone wanted to buy it so he marked the price up to $40. What was the markup rate?" Let's draw pictures of the problem. I am going to start with a rectangle and label it with $25. Now, it said that John WAS going to sell the bookbag for $25. So this is like the original price. That means it is our referent. It is the number we are going to refer to as 100% so we can figure out the percent increase or decrease.

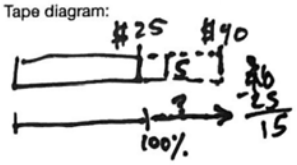




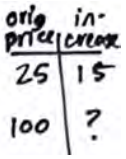
Then it said he marked the price up to $40. So I am going to draw more rectangle to show that the price increased to $40 and I am going to label that sale. Since that is what it sold for.



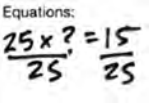
Then the question said, "What was the markup rate?" That's like asking, "What was the percent increase?" So I am going to draw a percent line. Remember that the original price is the 100% so we start there. The price when up so I will draw an arrow up. That's the question mark. That's what the question is asking for.



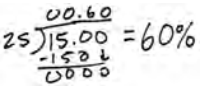
But we know from our last lesson that we often have to do an extra step to find the increase from 25 to 40, especially if we want to find the percent increase from 100% to a new percent. Let's figure that out. It is the difference between the selling price and the original price so 40 - 25, which is 15.



Now, we know we're going to set up a table and equation. I will make a table with the original price and the decrease. Let's fill these in. For the original and the markdown table, we would put 25 and 15. We know the original is 100%, and we can find this other value here.



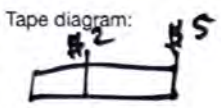
Let's write the equation. They are always based on REFERENT x PERCENT = QUANTITY. I am going to fill in 25 x question mark equals 15. We don't know the percent multiplier so we divide each side by 25.

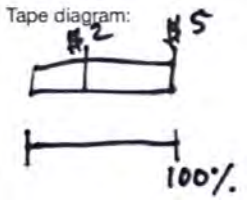


I am going to do that division quickly on the side just to move us along. At this point, you've seen how we put the decimal and two zeros. You've seen how we can add up 25s on the side if we need to. 15 divided by 25 is 0.60. That's a markup rate of 60%.

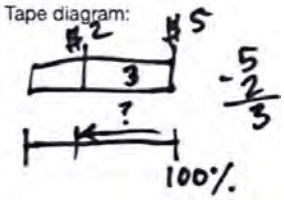
Now, if the question had asked what percent of the old price is the new price, I would have wanted to find the total final percent, which now we can see is 160%. But the point is we have to be very careful to know exactly what the question is asking for. Then we can put a question mark and make sure we find the number that corresponds to that question mark. It wasn't 40 this time. It was 40-25 this time.

Let's Think (Slide 5): The point of this is that we can always make at least two tables. We need words to make sense of them. This is especially important for markdown problems because it won't be as obvious which percent is for the selling price because it won't be over 100 like it was on the last slide. Since it's a markdown, the percent will be under 100. We really need words on the table to be clear on whether the percent represents the final percent or the percent of the markdown. I'll show you what I mean. Read the problem along with me while I read it out loud, "Ilana makes beautiful bracelets. She originally listed their price as $5 on her website. But she ended up marking them down to $2. What was the final markdown rate?" We'll start with our picture, which is even more important than ever because we can get two different percents and we need to keep track of what they mean. Okay, it said Ilana listed the price as $5. That's the original price. I am going to draw a rectangle and label it as $5 original.

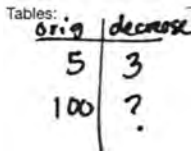




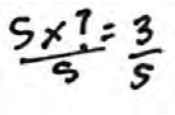
We've been saying for lots of lessons now that the original price is the referent. So let me go ahead and draw my percent line and label it as 100% original.



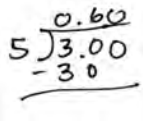
Now, the question is asking, "What was the final markdown rate?" It wants the markdown rate not the rate of the final price compared to the original. So my question mark is the arrow not the final price. That helps me see that I don't yet have the information I need to set up a table. I don't have a number that corresponds to the question mark. I have to find it. I will do $5 minus $2 is $3.



Let's draw the table. I will put the original price and the decrease so I can find the markdown rate. That's 5 and 3. Not the 2.



Now I can write an equation using REFERENT x PERCENT = QUANTITY. That will be 5 x question mark equals 3. I need to divide by 5 on each side to solve for the question mark.



I will do the division quickly for us on the side. 3 divided by 5 is 0.60 which is 60%. When I look back at my picture, that 60% was found using the markdown so it corresponds to the markdown rate. It is this arrow pointing back. We can says, “The markdown rate was 60%.” The main idea is that we need words and you need to come back to your picture to make sure that your final answer corresponds to what the question is asking.

Let’s Try It (Slide 6): Now we will practice some more problems. I will lead you through step by step.

WARM WELCOME

Today we will solve markup and markdown problems.

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Let's Review:

There are a lot of special words for buying and selling.

The shirt had a $5 markup.

There was a $2 markdown on the jeans.

The markup rate was 10%.

There as a 25% markdown rate.

The original price was $20.

It had a $10 selling price.

Let's Talk:

Markup and markdown problems are just percent change problems.

John had a bookbag that he was going to sell for $25. But then everyone wanted to buy it so he marked the price up to $40. What was the markup rate?

Tape diagram: Table: Equation:

Let's Think:

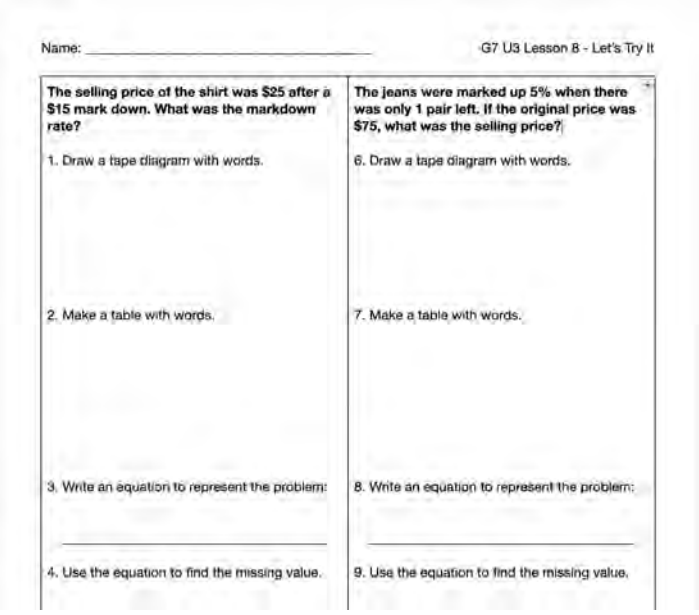
We can always make at least two tables. We need words to make sense of them.

Ilana makes beautiful bracelets. She originally listed their price as $5 on her website. But she ended up marking them down to $2. What was the final markdown rate?

Tape diagram: Table: Equation:

Let's Try It:

We will do it together step by step!



Name: _____ G7 U3 Lesson 8 - Let's Try It

The selling price of the shirt was $25 after a $15 mark down. What was the markdown rate?	The jeans were marked up 5% when there was only 1 pair left. If the original price was $75, what was the selling price?
1. Draw a tape diagram with words.	6. Draw a tape diagram with words.
2. Make a table with words.	7. Make a table with words.
3. Write an equation to represent the problem: _____	8. Write an equation to represent the problem: _____
4. Use the equation to find the missing value.	9. Use the equation to find the missing value.

On your Own:

Now it's time for you to do it on your own.

Name: _____ G7 U3 Lesson 8 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. A store marked up the price of a shirt by 30% and sold it for $65. What was the original price of the shirt? Tape diagram:	Equation:
2. The furniture store applied a 15% markup to a table. If the original price was $75. What was the selling price of the table? Tape diagram:	Equation:
3. A bakery marked down the price of a cake by 20% and Lisa bought it for $24. What was the original price of the cake? Tape diagram:	Equation:

The selling price of the shirt was $25 after a $15 mark down. What was the markdown rate?

1. Draw a tape diagram with words.

2. Make a table with words.

3. Write an equation to represent the problem:

_____

4. Use the equation to find the missing value.

5. Write your answer in a complete sentence.

_____

_____

_____

The jeans were marked up 5% when there was only 1 pair left. If the original price was $75, what was the selling price?

6. Draw a tape diagram with words.

7. Make a table with words.

8. Write an equation to represent the problem:

_____

9. Use the equation to find the missing value.

10. Write your answer in a complete sentence.

_____

_____

_____

Name: _____ G7 U3 Lesson 8 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. A store marked up the price of a shirt from $50 and sold it for $65. What was the markup rate? Tape diagram:	Equation: Final answer: _____
2. The furniture store applied a 15% markup to a table. If the original price was $75. What was the selling price of the table? Tape diagram:	Equation: Final answer: _____
3. A bakery marked down the price of a cake by 20% and Lisa bought it for $24. What was the original price of the cake? Tape diagram:	Equation: Final answer: _____
4. A tech store was going to sell a laptop for $900. But ended up selling it for $1000. What was the markup rate on the laptop? Tape diagram:	Equation: Final answer: _____

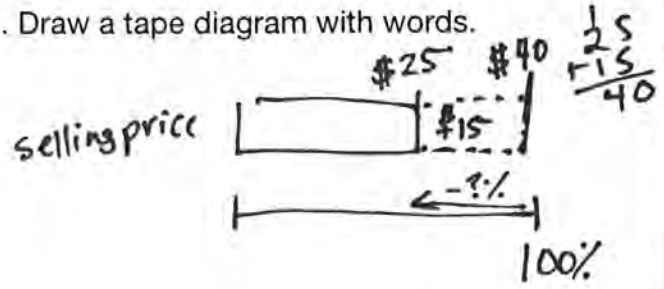
Solve each problem using an equation and a table.

5. A jewelry store applied a 10% discount to a $460 watch. What was the selling price of the watch? Tape diagram:	Equation: Final answer: _____
6. A toy store sold a game for $50 after setting the original price for $60. What was the rate of the markdown? Tape diagram:	Equation: Final answer: _____
7. A gardening store marked down their tomato plants by 20% at the end of the season. If each plant was sold for $6, what was the original price of each plant? Tape diagram:	Equation: Final answer: _____
8. The price of a basketball was $10. But then it was sold for $15. What was the markup rate of the basketball? Tape diagram:	Equation: Final answer: _____

Name: ANSWER KEY

The selling price of the shirt was $25 after a $15 mark down. What was the markdown rate?

1. Draw a tape diagram with words.



$25 + 15 = 40$

2. Make a table with words.

original	markdown
40	15
100	?

3. Write an equation to represent the problem:

original x percent = markdown

4. Use the equation to find the missing value.

$\frac{40 \times ?}{40} = \frac{15}{40}$

$40 \overline{)15.000}$ → 120, 300, −280, 200, −200, 000

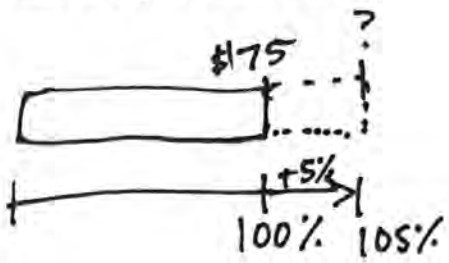
37.5%

5. Write your answer in a complete sentence.

The shirt was marked down 37.5%.

The jeans were marked up 5% when there was only 1 pair left. If the original price was $75, what was the selling price?

6. Draw a tape diagram with words.



7. Make a table with words.

original	sale
75	?
100	105

8. Write an equation to represent the problem:

original x percent = sale

9. Use the equation to find the missing value.

$75 \times 1.05 = ?$

$\$78.75$

75×105: 525, 7350 → 78.75

10. Write your answer in a complete sentence.

The selling price was $78.75.

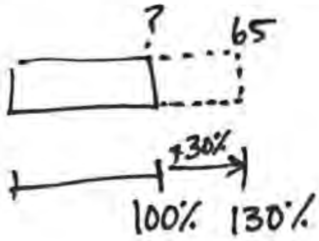
Name: ANSWER KEY

G7 U3 Lesson 8 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. A store marked up the price of a shirt by 30% and sold it for $65. What was the original price of the shirt?

Tape diagram:



Equation:

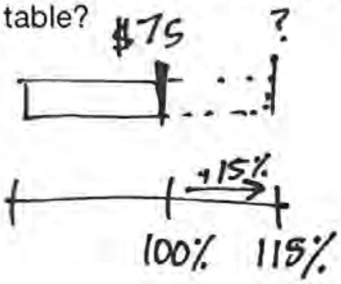
$$\frac{? \times 1.3}{1.3} = \frac{65}{1.3}$$

$1.3\overline{)65.0}$ → 050

$50

2. The furniture store applied a 15% markup to a table. If the original price was $75. What was the selling price of the table?

Tape diagram:



Equation:

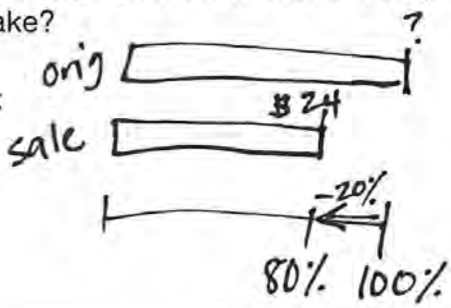
$$75 \times 1.15 = ?$$

1.15 × 75: 575 + 8050 = 86.25

$86.25

3. A bakery marked down the price of a cake by 20% and Lisa bought it for $24. What was the original price of the cake?

Tape diagram:



Equation:

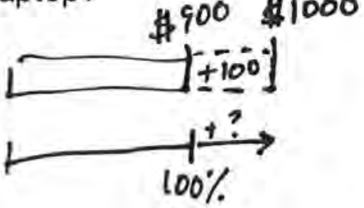
$$\frac{? \times 0.8}{0.8} = \frac{24}{0.8}$$

$0.8\overline{)24.0}$ → 030

$30

4. A tech store was going to sell a laptop for $900. But ended up selling it for $1000. What was the markup rate on the laptop?

Tape diagram:



Equation:

$$\frac{900 \times ?}{900} = \frac{100}{900}$$

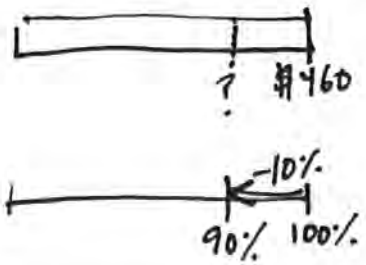
$900\overline{)100.00}$ → 000.11

11%

Solve each problem using an equation and a table.

5. A jewelry store applied a 10% discount to a $460 watch. What was the selling price of the watch?

Tape diagram:



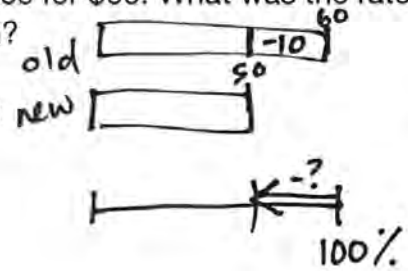
Equation: $460 \times .9 = ?$

$460 \times .9 = 414.0$

$414

6. A toy store sold a game for $50 after setting the original price for $60. What was the rate of the markdown?

Tape diagram:



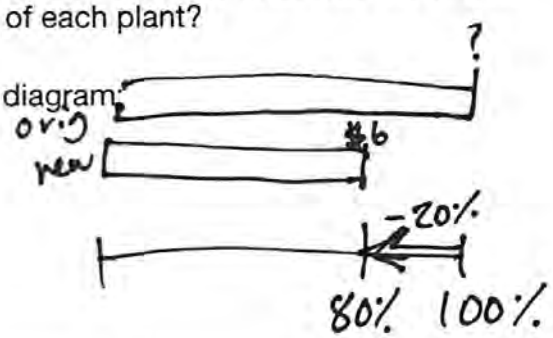
Equation: $\frac{60 \times ?}{60} = \frac{10}{60}$

$60\overline{)10.000}$ → 0.166

16.6%

7. A gardening store marked down their tomato plants by 20% at the end of the season. If each plant was sold for $6, what was the original price of each plant?

Tape diagram:



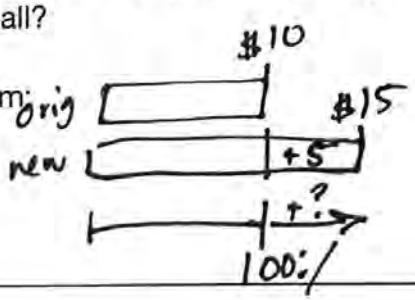
Equation: $\frac{? \times 0.8}{0.8} = \frac{6}{0.8}$

$0.8\overline{)6.0}$ → 7.5

$7.50

8. The price of a basketball was $10. But then it was sold for $15. What was the markup rate of the basketball?

Tape diagram:



Equation: $\frac{10 \times ?}{10} = \frac{5}{10}$

$10\overline{)5.00}$ → 0.50

50%

G7 U3 Lesson 9

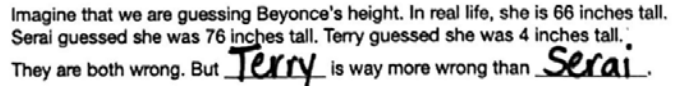
Understand and solve problems about sales tax.

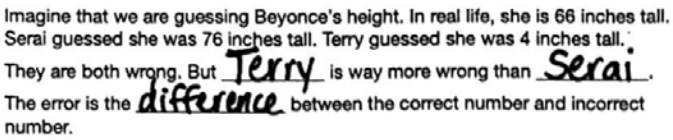
G7 U3 Lesson 9 - Today we will solve percent error problems.

Warm Welcome (Slide 1): Tutor choice

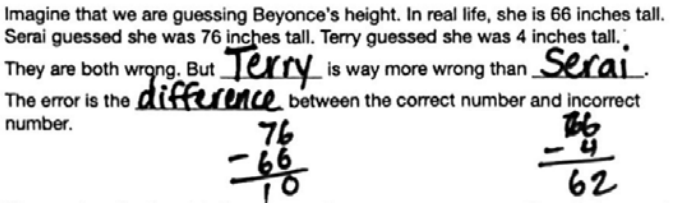
Frame the Learning/Connect to Prior Learning (Slide 2): Today we will solve percent error problems. These are just percent change problems in disguise. You're going to do great with them because you'll use the same picture, table and equation.

Let's Review (Slide 3): Sometimes we want to be able to describe the size of an error. An error is like a mistake. Imagine that we are guessing Beyonce's height. In real life, she is 66 inches tall. Serai guessed she was 76 inches tall. Terry guessed she was 4 inches tall. They are both wrong. But TERRY is way more wrong than SERAI. It's kind of funny actually. I'm not sure that Terry knows how big an inch is. Anyway…

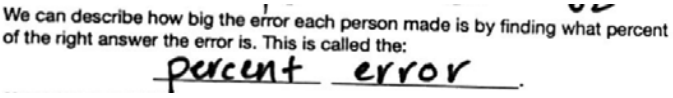




The error is the DIFFERENCE between the correct number and incorrect number.

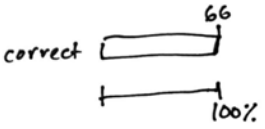


To find the difference, we subtract. And in this case, we don't care if the error is higher or lower so we just subtract the bigger number minus the smaller number. So, for Serai, the error is 76 minus 66, which is 10 inches. Not too bad. For Terry, the error is 66 minus 4, which is 62 inches. That's way WAY off.

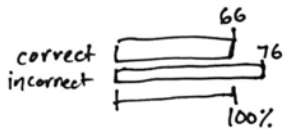


We can describe how big the error each person made is by finding what percent of the right answer the error is. This is called the PERCENT ERROR. I'm going to show you the math we do using the same tools we've been using.

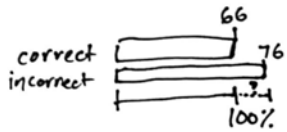
Let's Talk (Slide 4): The most important thing to remember is that the correct number will always be the referent, which corresponds to 100%. That's just like how the original price was the referent in the last lesson. We always need a baseline that we are comparing to, and in this case we are comparing error to the correct number. Let's draw a picture. I will draw a rectangle for the correct number, 66. And I better write the word, correct, to make sure I know that is the referent. In fact, I am going to put the percent line right now and label it 100%.

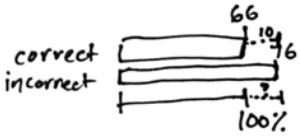


Okay, Serai guessed 76 inches. Let me draw that in.

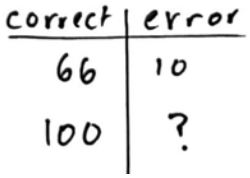


I have to extend my percent line and I can mark the percent here with a question mark. But that is not the percent error. That's the percent that the wrong answer is out of the right answer.

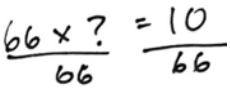




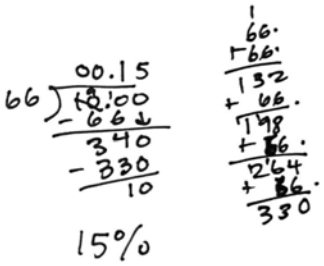
I just want the percent of the error, the difference between the correct and incorrect answer here. So, there is always going to be a key first step on this picture and that is finding the error. I need to find the error to find the percent error. I always subtract the biggest number minus the smallest number. We already did 76 minus 66 is 10. If we go back to our picture, this block is 10. This is the error.



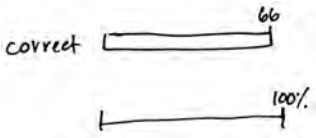
Now we can set up our table. I am going to always have the correct number and the error. I use the incorrect number to find the error but it doesn't do me any good to put it on my table. The correct number was 66 and the error was 6. We know 66 corresponds to 100% and now I can set up my equation.



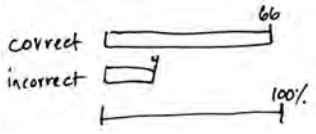
My equation is REFERENT x PERCENT = QUANTITY. In this case, it is like CORRECT NUMBER x PERCENT ERROR = ERROR. We have 66 times question mark equals 10. To find this amount, I divide by 66 on each side of the equation.



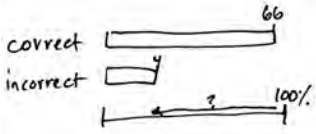
I am going to do 10 divided by 66 quickly over to the side. I might have to add up 66s on the side too. I get 0.15 with a little leftover but I will leave it here for now. That's 15%. Now we can say Serai's answer was 15% away from the correct answer.



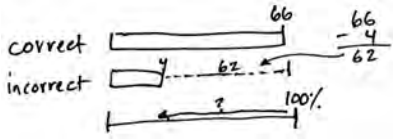
Let's Think (Slide 5): Now let's figure out Terrry. We need to make sure we calculate the percent error not just the percent comparison so we're going to draw that picture very carefully and do the subtraction to find the error just like we did on our last slide. I am going to draw a picture. We start with 66 again. That is 100%.



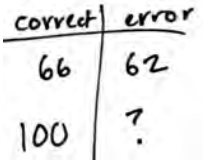
Now Terry guessed Beyonce was 4 inches tall. That's hilarious. Let's mark 4 inches. We can make a line for the percent. But that's not the percent we want.



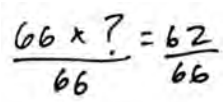
We want the percent error, which is this difference.



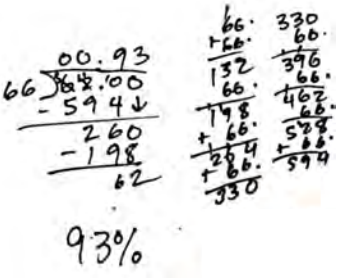
So we need to find the difference between our numbers. We already did 66 minus 4 earlier. The difference is 62. The error is 62. I am going to mark that on my picture.



Now we can set up our table. I am going to always have the correct number and the error. I use the incorrect number to find the error but it doesn't do me any good to put it on my table. The correct number was 66 and the error was 62. We know 66 corresponds to 100% and now I can set up my equation.



My equation is REFERENT x PERCENT = QUANTITY. In this case, it is like CORRECT NUMBER x PERCENT ERROR = ERROR. We have 66 times question mark equals 62. To find this amount, I divide by 66 on each side of the equation.



I am going to do 62 divided by 66 quickly over to the side. I might have to add up 66s on the side too. I get 0.93 with a little leftover but I will leave it here for now. That's 93%. Now we can say Serai's answer was 93% away from the correct answer.

You can see how finding the percent error helps us see that someone was wrong but also HOW wrong. Terry's answer was 93% away from the correct answer.

Let's Try It (Slide 6): Now we will practice some more problems. I will lead you through step by step.

WARM WELCOME

Today we will solve percent error problems.

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Let's Review:

Sometimes we want to be able to describe the size of an error.

Imagine that we are guessing Beyonce's height. In real life, she is 66 inches tall. Serai guessed she was 76 inches tall. Terry guessed she was 4 inches tall.

They are both wrong. But _____ is way more wrong than _____.

The error is the _____ between the correct number and incorrect number.

We can describe how big the error each person made is by finding what percent of the right answer the error is. This is called the:

_____ _____.

Let's Talk:

The correct number will always be the referent, which corresponds to 100%.

Beyonce is 66 inches tall. Serai guessed she was 76 inches tall. What is the percent error?

Tape diagram: Table: Equation:

Let's Think:

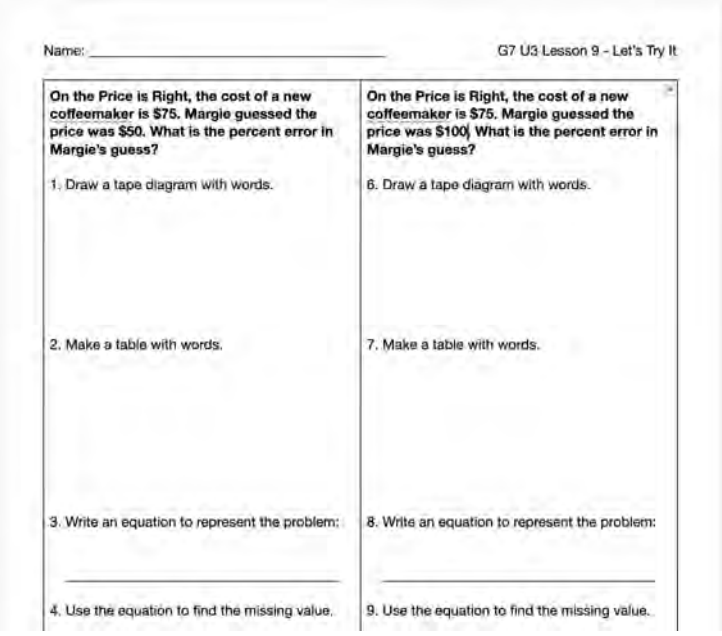
We need to make sure we calculate the percent error not the percent comparison.

Beyonce is 66 inches tall. Terry guessed she was 4 inches tall. What is the percent error?

Tape diagram: Table: Equation:

Let's Try It:

We will do it together step by step!



Name: _____ G7 U3 Lesson 9 - Let's Try It

On the Price is Right, the cost of a new coffeemaker is $75. Margie guessed the price was $50. What is the percent error in Margie's guess?	**On the Price is Right, the cost of a new coffeemaker is $75. Margie guessed the price was $100. What is the percent error in Margie's guess?**
1. Draw a tape diagram with words.	6. Draw a tape diagram with words.
2. Make a table with words.	7. Make a table with words.
3. Write an equation to represent the problem: _____	8. Write an equation to represent the problem: _____
4. Use the equation to find the missing value.	9. Use the equation to find the missing value.

On your Own:

Now it's time for you to do it on your own.

Name: _____ G7 U3 Lesson 9 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. In Science class, Robbie was asked to weigh a 200 kg mass. She wrote 220 kg on her paper. What was Robbie's percent error? Tape diagram:	Equation: Final answer:_____
2. The teacher expected that 24 students would be in school but only 18 students were present. What was the percent error in the teacher's prediction? Tape diagram:	Equation: Final answer:_____
3. Ruby said the length of her sprint was 9.5 minutes. The official coach's report recorded it as 10 minutes. What was the percent error in what Ruby said? Tape diagram:	Equation:

On the Price is Right, the cost of a new coffeemaker is $75. Margie guessed the price was $50. What is the percent error in Margie's guess?

1. Draw a tape diagram with words.

2. Make a table with words.

3. Write an equation to represent the problem:

_____

4. Use the equation to find the missing value.

5. Write your answer in a complete sentence.

_____

_____

_____

On the Price is Right, the cost of a new coffeemaker is $75. Margie guessed the price was $100. What is the percent error in Margie's guess?

6. Draw a tape diagram with words.

7. Make a table with words.

8. Write an equation to represent the problem:

_____

9. Use the equation to find the missing value.

10. Write your answer in a complete sentence.

_____

_____

_____

Name: _____ G7 U3 Lesson 9 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. In Science class, Robbie was asked to weigh a 200 kg mass. She wrote 220 kg on her paper. What was Robbie's percent error? Tape diagram:	Equation: Final answer: _____
2. The teacher expected that 24 students would be in school but only 18 students were present. What was the percent error in the teacher's prediction? Tape diagram:	Equation: Final answer: _____
3. Ruby said the length of her sprint was 9.5 minutes. The official coach's report recorded it as 10 minutes. What was the percent error in what Ruby said? Tape diagram:	Equation: Final answer: _____
4. The real age of a tree was 40 years. Tom incorrectly estimated it to be 50 years. What was the percent error in his estimation? Tape diagram:	Equation: Final answer: _____

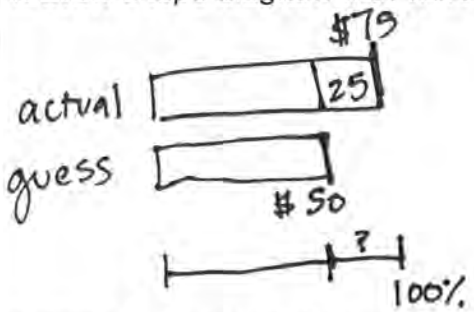
Solve each problem using an equation and a table.

5. Lisa's brother measured her height and said it was 54 inches. But her real height is 60 inches. What was the brother's percent error? Tape diagram:	Equation: Final answer: _____
6. The weatherman said that it was going to be 85 degrees. It was actually 90 degrees. What was the percent error in the weatherman's prediction? Tape diagram:	Equation: Final answer: _____
7. A textbook was priced at $45. Sarah thought it was going to be $50. What was the percent error in her estimation of the book's price? Tape diagram:	Equation: Final answer: _____
8. The speed limit was 60 miles per hour. Nathaniel thought it was 70 miles per hour. What was Nathaniel's percent error? Tape diagram:	Equation: Final answer: _____

Name: ANSWER KEY

On the Price is Right, the cost of a new coffeemaker is $75. Margie guessed the price was $50. What is the percent error in Margie's guess?

1. Draw a tape diagram with words.



75
−50
25

2. Make a table with words.

actual	error
75	25
100	?

3. Write an equation to represent the problem:

actual × percent = error

4. Use the equation to find the missing value.

$\frac{75 \times ?}{75} = \frac{25}{75}$

33%

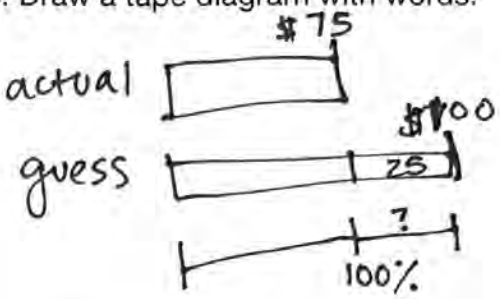
00.33
75)25.00
225
250
225
25

5. Write your answer in a complete sentence.

Margie's guess was 33% off of the real price.

On the Price is Right, the cost of a new coffeemaker is $75. Margie guessed the price was $100. What is the percent error in Margie's guess?

6. Draw a tape diagram with words.



9
100
−75
25

7. Make a table with words.

actual	
75	25
100	?

8. Write an equation to represent the problem:

actual × percent = error

9. Use the equation to find the missing value.

$\frac{75 \times ?}{75} = \frac{25}{75}$ same!

33%

10. Write your answer in a complete sentence.

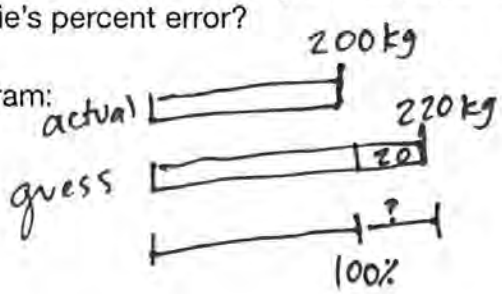
Margie's guess was 33% off of the real price.

Name: ~~MATH~~ ANSWER KEY G7 U3 Lesson 9 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. In Science class, Robbie was asked to weigh a 200 kg mass. She wrote 220 kg on her paper. What was Robbie's percent error?

Tape diagram:



Equation:

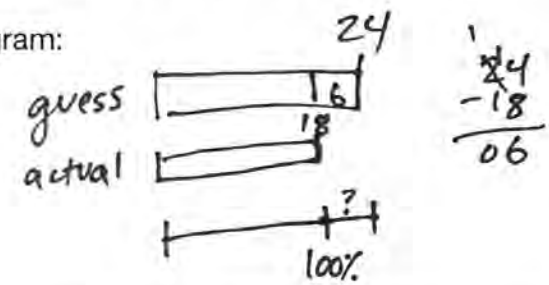
$$\frac{200 \times ?}{200} = \frac{20}{200}$$

$$200\overline{)20.00}\ 00.10,\ -200,\ 000$$

Final answer: 10%

2. The teacher expected that 24 students would be in school but only 18 students were present. What was the percent error in the teacher's prediction?

Tape diagram:



$$\begin{array}{r} 1 \\ 24 \\ -18 \\ \hline 06 \end{array}$$

Equation:

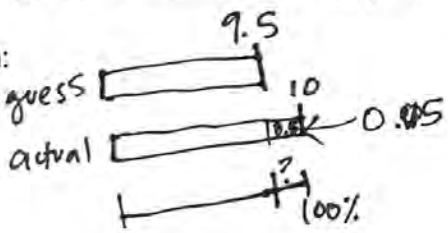
$$\frac{18 \times ?}{18} = \frac{6}{18}$$

$$18\overline{)6.00}\ 0.33,\ 54,\ 60,\ -54,\ 6$$

Final answer: 33%

3. Ruby said the length of her sprint was 9.5 minutes. The official coach's report recorded it as 10 minutes. What was the percent error in what Ruby said?

Tape diagram:



$$\begin{array}{r} 10.0 \\ -\ 9.5 \\ \hline 0.5 \end{array}$$

Equation:

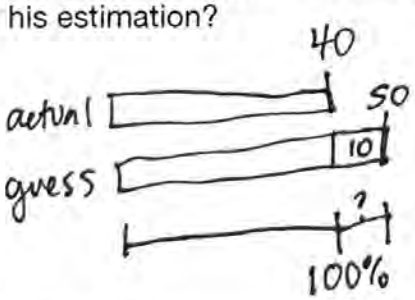
$$\frac{10 \times ?}{10} = \frac{0.05}{10}$$

$$10\overline{)0.50}\ 0.05,\ 50,\ 00$$

Final answer: 5%

4. The real age of a tree was 40 years. Tom incorrectly estimated it to be 50 years. What was the percent error in his estimation?

Tape diagram:



Equation:

$$\frac{40 \times ?}{40} = \frac{10}{40}$$

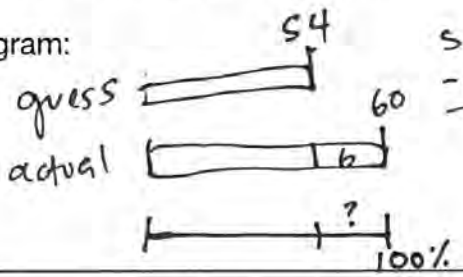
$$40\overline{)10.00}\ 00.25,\ 80,\ 200,\ -200,\ 000$$

Final answer: 25%

Solve each problem using an equation and a table.

5. Lisa's brother measured her height and said it was 54 inches. But her real height is 60 inches. What was the brother's percent error?

Tape diagram:



$60 - 54 = 6$

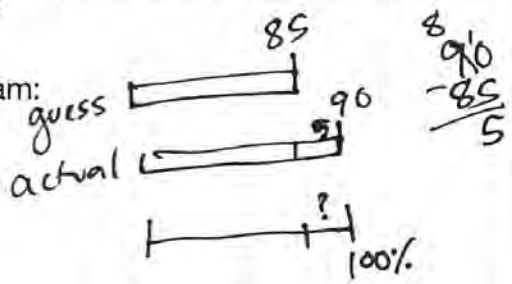
Equation: $\frac{60 \times ?}{60} = \frac{6}{60}$

$60 \overline{)6.00}$ → 0.10, -60, 00

Final answer: 10%

6. The weatherman said that it was going to be 85 degrees. It was actually 90 degrees. What was the percent error in the weatherman's prediction?

Tape diagram:



$90 - 85 = 5$

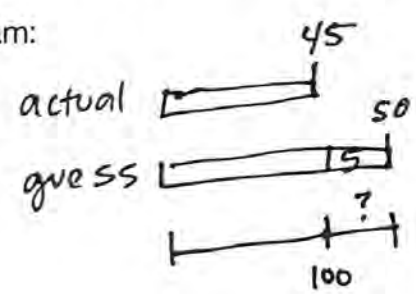
Equation: $\frac{90 \times ?}{90} = \frac{5}{90}$

$90 \overline{)5.00}$ → 0.05, 450, 50

Final answer: 5%

7. A textbook was priced at $45. Sarah thought it was going to be $50. What was the percent error in her estimation of the book's price?

Tape diagram:



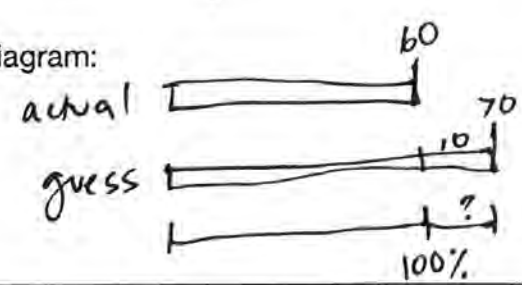
Equation: $\frac{45 \times ?}{45} = \frac{5}{45}$

$45 \overline{)5.00}$ → 0.11, 45, 50, 45, 5

Final answer: 11%

8. The speed limit was 60 miles per hour. Nathaniel thought it was 70 miles per hour. What was Nathaniel's percent error?

Tape diagram:



Equation: $\frac{60 \times ?}{60} = \frac{10}{60}$

$60 \overline{)10.00}$ → 0.16, -60, 400, -360, 40

16%

G7 U3 Lesson 10

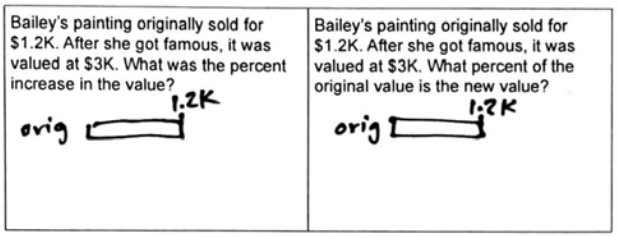
Understand and solve problems about commission, markups, and discounts.

G7 U3 Lesson 10 - Today we will solve a variety of problems for review.

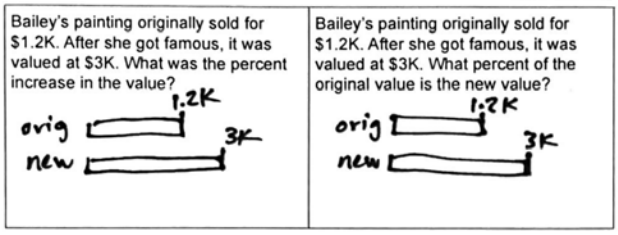
Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we will solve a variety of problems for review. We're especially going to focus on when the problems seem really similar with only a small difference in wording. We are going to have to read very closely to see what the question is really asking for.

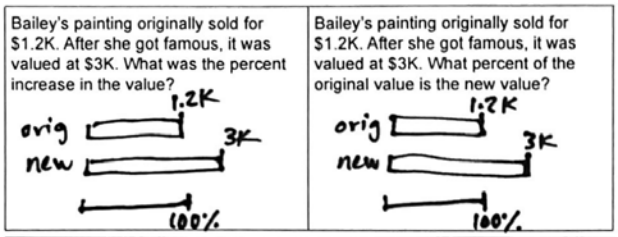
Let's Review (Slide 3): We know how to write a picture, table and equation to solve percent problems. This is asking, "How are the problems the same or different?" Read the first problem along with me while I read it out loud, "Bailey's painting originally sold for $1.2K. After she got famous, it was valued at $3K. What was the percent increase in the value?" Now let's read the next problem. It starts off the same. It says, "Bailey's painting originally sold for $1.2K. After she got famous, it was valued at $3K. What percent of the original value is the new value?" So, let's draw a picture. I know I am going to have 1.2K original for both.



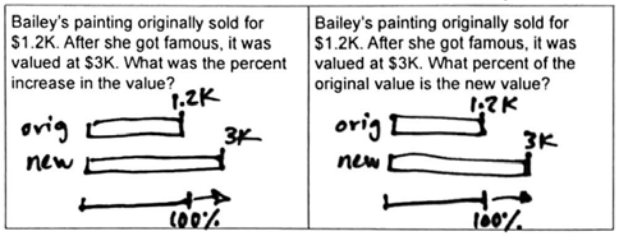
I know that she got famous and it increased to 3K for both. I'll write new for that price.



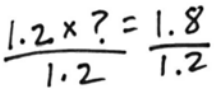
In both cases, when I draw the percent, the 1.2K is the original so it is the referent. It is the 100%.



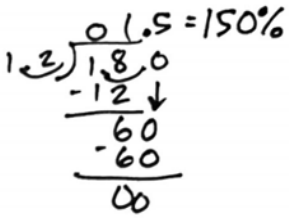
And in both cases, the value increased so I can draw an arrow and mark the new value. Wow, this really seems like the same problem!



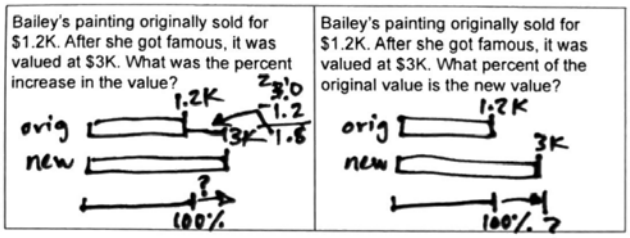
But here's where it gets interesting. This first problem wants to know the percent increase, which is this arrow here. I'll put a question mark. That is where it's increasing, going up. So if I'm going to find the percent increase. I need to find this dollar increase first. I will have to do 3 minus 1.2. I am going to do this quickly because this isn't a subtraction lesson. But I'll need to put a decimal on that 3 with a zero so I can borrow. I get 1.8.



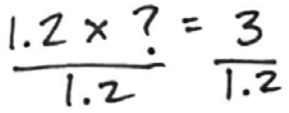
So now I can see that when I write my table, I will use 1.2 and 1.8. And when I write the equation, it will be 1.2 x question mark equals 1.8.



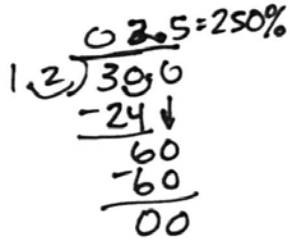
I am going to do this math for you because number-crunching is not really the point right now. I divide by 1.2 on each side and do 1.8 divided by 1.2. That's really 18 divided by 12. I get 1.50. That's 150%. If we go back and look at our picture, it makes sense. It went up more than 100% because it went up more than 1.2.



Now for the second problem, It wants to know, "What percent of the original value is the new value?" Essentially, it wants me to compare the new value to the original value. The value increased but it's not a percent increase problem. The question mark for the percent comparison would be here.

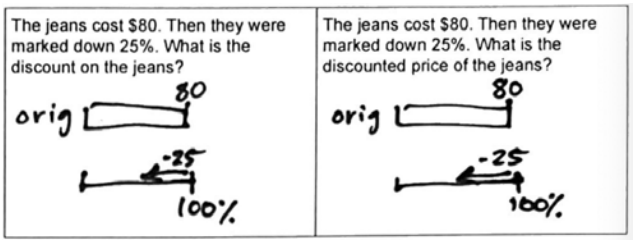


And then when I set up my table, I am comparing original value and new value, and my equation is 1.2 x question mark equals 3 and I need to divide each side by 1.2.

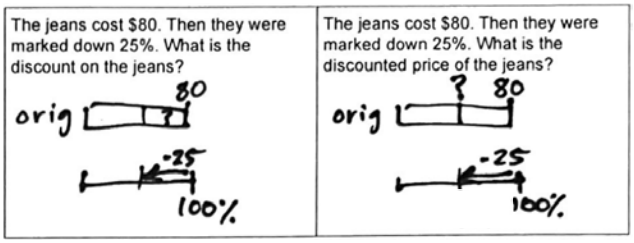


I will do that math quickly for us. 3 divided by 1.2 is the same as 30 divided by 12. That is 2.50 which is 250%. That makes sense because 100% plus the 150% of the last problem is 250%, and we can mark it on our picture here. Even though these were very similar problems, the final answer was different because of what the question was asking.

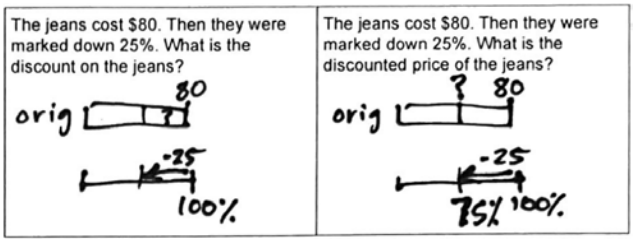
Let's Talk (Slide 4): The problems below might also seem similar but "There is a difference between asking for the discount and the discounted price." Let's read these problems and figure out, "Which problem requires an extra step?" *Read both problems out loud while the kids read along silently.* I am going to draw a rectangle for both problems and label it $80 original. I am going to draw a percent line with 100% and draw my arrow down to show the 25% markdown.



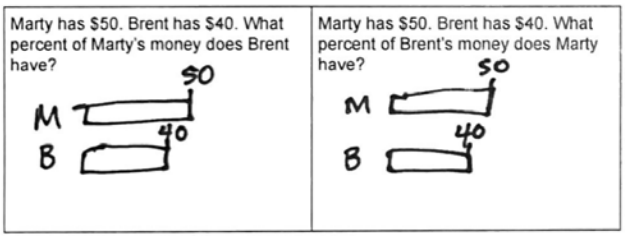
Now let's mark what the question of each problem is asking for. This first problem says, "What is the discount on the jeans?" It wants to know the amount of the discount or the amount of the decrease. In other words, it wants to know how much was subtracted. I can shade that here. It is the 25%. So in my table I would do original and discount and use 25% to find it.



In the other problem, it says, “What is the discounted price of the jeans?” It wants to know the new price AFTER the discount is subtracted. Do you see how this requires an extra step? I can either subtract the discount I find in the last problem. Or I can subtract the 25% and find this percent here.

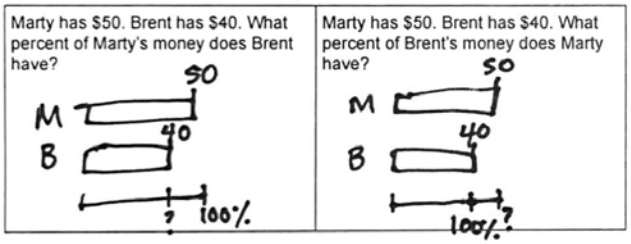


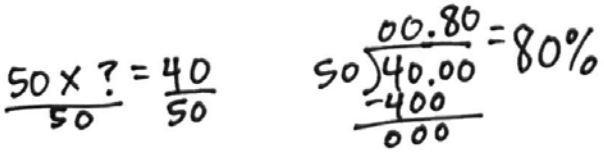
Let’s do that last one. 100 minus 25 is 75. I will mark 75% on my picture. Now when I have my table I will use the original price and the new price. I will use 100% and 75%. We are not going to find these problems all the way right now. The point is that they are not the same. I really have to pay attention to what the question is asking.



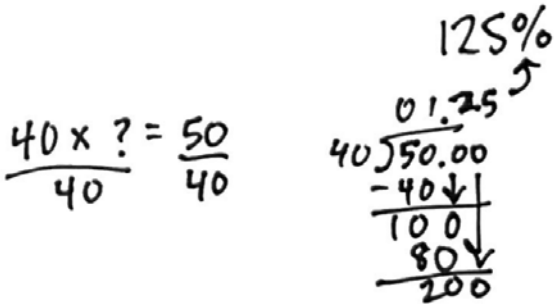
Let’s Think (Slide 5): We are going to think of one more set of problems where we really have to make sure we keep in mind this tip: “The referent is always the amount we’re finding the percent of.” We are asked here, “What is the referent in each problem?” Read along silently with me while I read each problem out loud. *Read each problem.* In both these problems, Marty has $50 and Brent has $40. So we can draw two rectangles lined up at the start.

Next we will need percent lines. But here is the key. This first problem is asking, “What percent of Marty’s money does Brent have?” But this other question is asking, “What percent of Brent’s money does Marty have?” For the first problem the key words are “percent of” because the words right after those words are the referent. It says, “What percent of Marty’s money” so Marty’s money is the referent. I will put the 100% lined up with Marty and find the other percent from there. It is going to be less than 100%. For the second problem, it says, “What percent of Brenty’s money” so Brent’s money is the referent. I will put the 100% lined up with Brent and find the other percent from there. It is going to be more than 100%.





The first table would be referent then quantity with 50 then 40. And the 50 corresponds to 100%. When I set up my equation it is 50 x question mark equals 40. To solve, I divide by 50 on both sides. 40 divided by 50 is 0.80 which is 80%.



The second table would be referent then quantity with 40 then 50. And the 40 corresponds to 100%. When I set up my equation it is 40 x questions equals 50. I divide by 40 on both sides. 50 divided by 40 is 1.25 which is 125%. Those are totally different answers. We are going to have to draw really carefully and pay close attention to what the question is asking today.

Let’s Try It (Slide 6): Now we will practice some more problems. I will lead you through step by step.

WARM WELCOME

Today we will solve a variety of problems for review.

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Let's Review:

We know how to write a picture, table and equation to solve percent problems.

How are the problems the same or different?

Bailey's painting originally sold for $1.2K. After she got famous, it was valued at $3K. What was the percent increase in the value?	Bailey's painting originally sold for $1.2K. After she got famous, it was valued at $3K. What percent of the original value is the new value?

Let's Talk:

There is a difference between asking for the discount and the discounted price.

Which problem requires an extra step?

The jeans cost $80. Then they were marked down 25%. What is the discount on the jeans?	The jeans cost $80. Then they were marked down 25%. What is the discounted price of the jeans?

Let's Think:

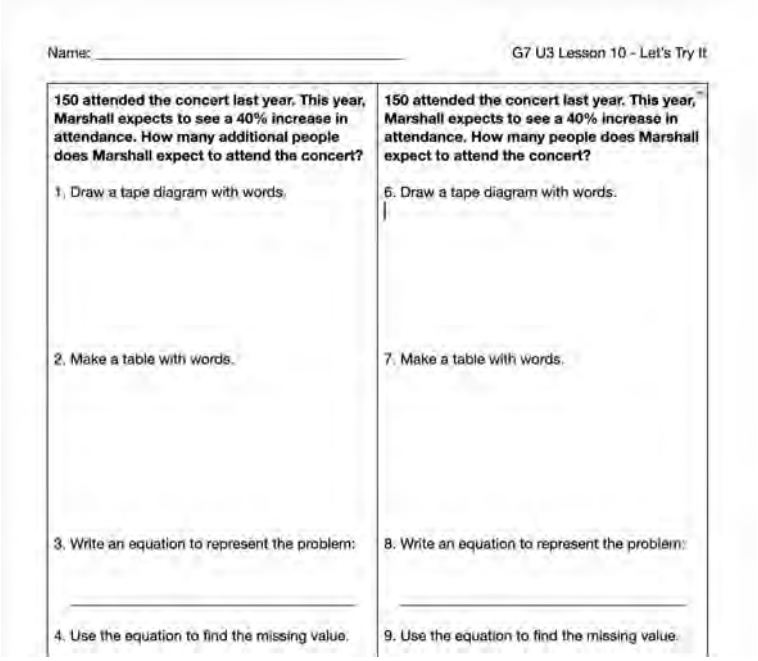
The referent is always the amount we're finding the percent of.

Which number is the referent in each problem?

Marty has $50. Brent has $40. What percent of Marty's money does Brent have?	Marty has $50. Brent has $40. What percent of Brent's money does Marty have?

Let's Try It:

We will do it together step by step!



Name: _____ G7 U3 Lesson 10 - Let's Try It

150 attended the concert last year. This year, Marshall expects to see a 40% increase in attendance. How many additional people does Marshall expect to attend the concert?	**150 attended the concert last year. This year, Marshall expects to see a 40% increase in attendance. How many people does Marshall expect to attend the concert?**
1. Draw a tape diagram with words.	6. Draw a tape diagram with words.
2. Make a table with words.	7. Make a table with words.
3. Write an equation to represent the problem: _____	8. Write an equation to represent the problem: _____
4. Use the equation to find the missing value.	9. Use the equation to find the missing value.

On your Own:

Now it's time for you to do it on your own.

Name: _____ G7 U3 Lesson 10 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. A company reduced its workforce by 12% due to budget cuts. If the original number of employees was 200, how many employees were let go? Tape diagram:	Equation: Final answer: ____
2. A company reduced its workforce by 12% due to budget cuts. If the original number of employees was 200, how many employees does it have now? Tape diagram:	Equation: Final answer: ____
3. Janice has earned $20 mowing lawns. Kelsey earned $25 babysitting. What percent of the money that Kelsey earned did Janice earn? Tape diagram:	Equation:

150 attended the concert last year. This year, Marshall expects to see a 40% increase in attendance. How many additional people does Marshall expect to attend the concert?

1. Draw a tape diagram with words.

2. Make a table with words.

3. Write an equation to represent the problem:

_____

4. Use the equation to find the missing value.

5. Write your answer in a complete sentence.

_____

_____

_____

150 attended the concert last year. This year, Marshall expects to see a 40% increase in attendance. How many people does Marshall expect to attend the concert?

6. Draw a tape diagram with words.

7. Make a table with words.

8. Write an equation to represent the problem:

_____

9. Use the equation to find the missing value.

10. Write your answer in a complete sentence.

_____

_____

_____

Name: _____ G7 U3 Lesson 10 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. A company reduced its workforce by 12% due to budget cuts. If the original number of employees was 200, how many employees were let go? Tape diagram:	Equation: Final answer: _____
2. A company reduced its workforce by 12% due to budget cuts. If the original number of employees was 200, how many employees does it have now? Tape diagram:	Equation: Final answer: _____
3. Janice has earned $20 mowing lawns. Kelsey earned $25 babysitting. What percent of the money that Kelsey earned did Janice earn? Tape diagram:	Equation: Final answer: _____
4. Janice has earned $20 mowing lawns. Kelsey earned $25 babysitting. What percent of the money that Janice earned did Kelsey earn? Tape diagram:	Equation: Final answer: _____

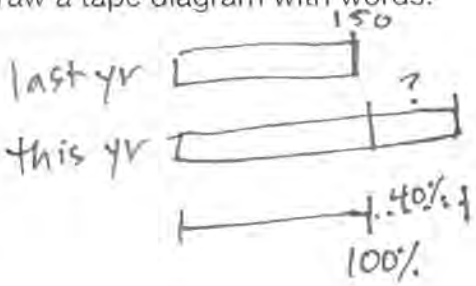
Solve each problem using an equation and a table.

5. The price of a laptop was $900. Then it was marked down 10%. What is the new cost of the laptop? Tape diagram:	Equation: Final answer: _____
6. The price of a laptop was $900. Then it was marked down 10%. How much was the laptop marked down? Tape diagram:	Equation: Final answer: _____
7. The watch was initially valued at $120. After 10 years, its value fell to $100. What was the percent decrease in its value? Tape diagram:	Equation: Final answer: _____
8. The watch was initially valued at $120. After 10 years, its value fell to $100. What percent of the original value is the new value? Tape diagram:	Equation: Final answer: _____

Name: ANSWER KEY

150 attended the concert last year. This year, Marshall expects to see a 40% increase in attendance. How many additional people does Marshall expect to attend the concert?

1. Draw a tape diagram with words.



2. Make a table with words.

referent	increase
150	?
100	40

3. Write an equation to represent the problem:

referent × percent = increase

4. Use the equation to find the missing value.

$150 \times 0.4 = ?$

$$\begin{array}{r} {}^{2}150 \\ \times\ 0.4 \\ \hline 60.0 \end{array}$$

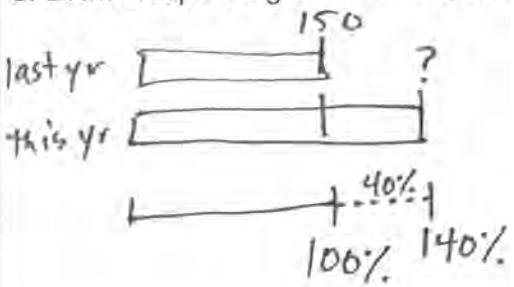
60

5. Write your answer in a complete sentence.

Marshall expects 60 additional people.

150 attended the concert last year. This year, Marshall expects to see a 40% increase in attendance. How many people does Marshall expect to attend the concert?

6. Draw a tape diagram with words.



7. Make a table with words.

referent	new
150	?
100	140

8. Write an equation to represent the problem:

referent × percent = new

9. Use the equation to find the missing value.

$150 \times 1.4 = ?$

$$\begin{array}{r} {}^{2}150 \\ \times\ 1.4 \\ \hline 600 \\ 150\,0 \\ \hline 210.0 \end{array}$$

210

10. Write your answer in a complete sentence.

Marshall expects 210 people to attend this year.

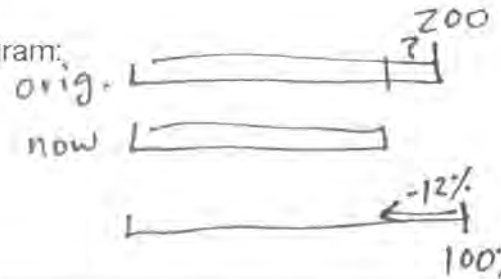
Name: ANSWER KEY

G7 U3 Lesson 10 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. A company reduced its workforce by 12% due to budget cuts. If the original number of employees was 200, how many employees were let go?

Tape diagram:



Equation:

$200 \times 0.12 = ?$

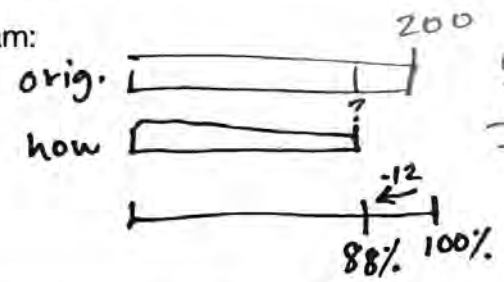
$0.12 \times 200 = 24.00$

24

Final answer: 24 employees

2. A company reduced its workforce by 12% due to budget cuts. If the original number of employees was 200, how many employees does it have now?

Tape diagram:



$100 - 12 = 88$

Equation:

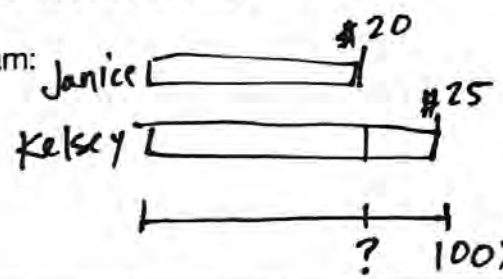
$200 \times 0.88 = ?$

$0.88 \times 200 = 176.00$

Final answer: 176 employees

3. Janice has earned $20 mowing lawns. Kelsey earned $25 babysitting. What percent of the money that Kelsey earned did Janice earn?

Tape diagram:



Equation:

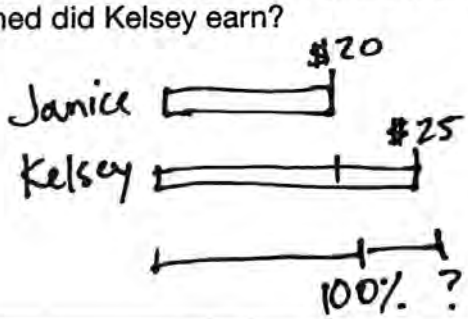
$$\frac{25 \times ?}{25} = \frac{20}{25}$$

$25 \overline{)20.00} = 0.80$

Final answer: 80%

4. Janice has earned $20 mowing lawns. Kelsey earned $25 babysitting. What percent of the money that Janice earned did Kelsey earn?

Tape diagram:



Equation:

$$\frac{20 \times ?}{20} = \frac{25}{20}$$

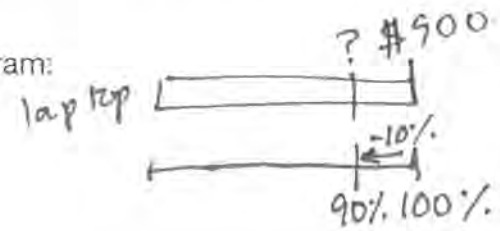
$20 \overline{)25.00} = 1.25$

Final answer: 125%

Solve each problem using an equation and a table.

5. The price of a laptop was $900. Then it was marked down 10%. What is the new cost of the laptop?

Tape diagram:



Equation:

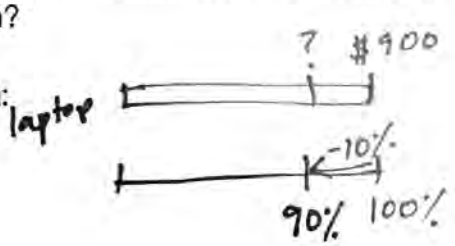
$900 \times 0.9 = ?$

900
× 0.9
810.0

Final answer: $810

6. The price of a laptop was $900. Then it was marked down 10%. How much was the laptop marked down?

Tape diagram:



Equation:

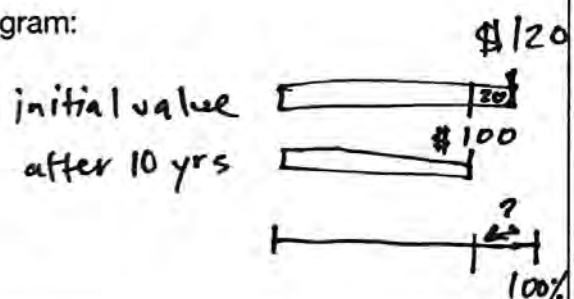
$900 \times 0.1 = ?$

900
× 0.1
90.0

Final answer: $90

7. The watch was initially valued at $120. After 10 years, its value fell to $100. What was the percent decrease in its value?

Tape diagram:



Equation:

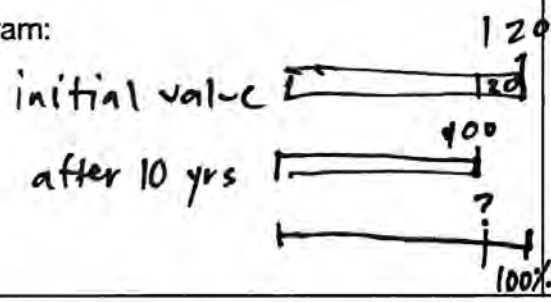
$$\frac{120 \times ?}{120} = \frac{20}{120}$$

00.16
120)20.00
120↓
800
720
80

Final answer: 16%

8. The watch was initially valued at $120. After 10 years, its value fell to $100. What percent of the original value is the new value?

Tape diagram:



Equation:

$$\frac{120 \times ?}{120} = \frac{100}{120}$$

000.83
120)100.00
960↓
400

Final answer: 83%

G7 U3 Lesson 11

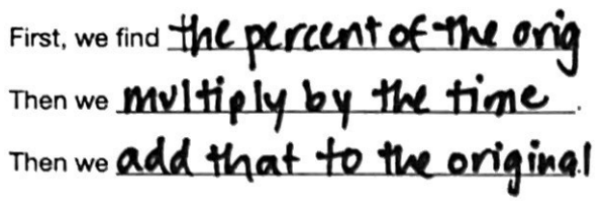
Understand and solve problems involving percentage increase and percentage decrease using real world contexts such as tax, tip, and discount.

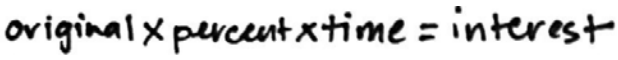
G7 U3 Lesson 11 - Today we will solve simple interest problems.

Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we will solve simple interest problems. You actually need to think about this in real life because it comes up. Let's dive in!

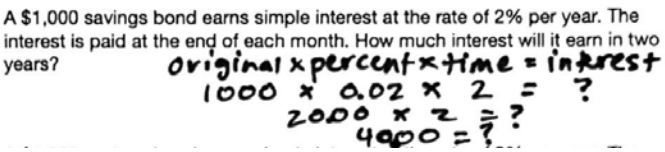
Let's Review (Slide 3): In real life, "people are paid interest on the money they save in a bank or they have to pay interest on loans they borrow." Basically, when we save in a bank, the bank can use the money while it's holding onto it. So the bank pays you a little big of extra money called interest based on how much it is holding onto. Or if you are borrowing money and the bank is lending you money. They you pay interest to the bank as a way to pay them for letting you use the money. The interest is always a percent. And it is always based on the original amount you are starting with. It is also dependent on time. The longer you save, the more interest you get. The longer you borrow, the more interest you have to pay. Read along with me while I read this example, "Name the steps to make a table to find what happens if Lisa has a $100 credit card balance and she has to pay 10% interest each month." I see that there is January. 10% of 100 is $10 in interest. If we add that to the $100 then she owes $110 in January. The next month, February, will be $10 for two months so that's $20 interest. If we add that to the $100 then it's $120. You can see what's happening here. 3 months would be $10 for 3 months. First, we find THE PERCENT OF THE ORIGINAL AMOUNT. That's always the original times the percent like we've always done. But then it got multiplied by the number of months. So we'll have to do that too. So then we multiply by the time. And finally, if we wanted to find the balance, we had to add that to the original amount. So then we add the original amount.



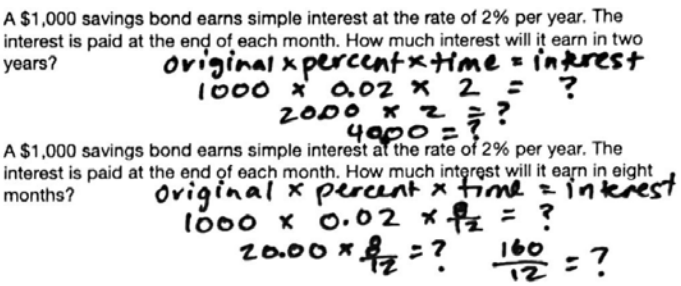


I am going to write that as one big equation: ORIGINAL X PERCENT X TIME = INTEREST. This equation is very similar to what we've been using for the last 10 lessons. All we did was add time. We could also write: ORIGINAL X PERCENT X TIME + ORIGINAL = NEW. That is also the same as what we've been doing. We just add the original amount to find the new amount with interest.

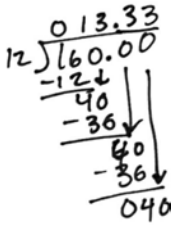
Let's Talk (Slide 4): Sometimes the time we have to solve for might be a fractional amount. Let's explore these problems. *Read the first one.* I know I'm trying to find the interest so I will write the equation: ORIGINAL X PERCENT X TIME = INTEREST. I know the original amount is 1,000 times the interest, which is 0.02, times 2, which is the number of years. This is pretty straight forward. Let's do the math to the side. 1000 x 0.02 is 2000 then we add the decimal point with two place values after it. We get 20. Now we do 20 x 2, which is 40. The interest it will earn in two years will be $40.



Now let's read the next problem. *Read the second problem.* We still have the same equation. The original amount is still 1,000 times the interest rate, which is 0.2. But this time we don't have a full year. We have eight months. Months are a fraction of the year so I am going to have to multiply all this times a fraction. That is 8 out of 12 since it said 8 months and there are 12 months in a year.

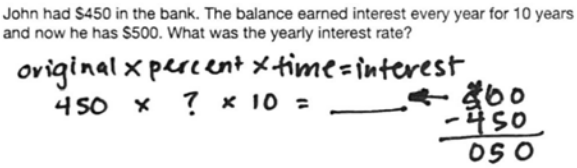


Let's do the math. We know 1000 x 0.02 is 20 from before. Now I need to do 20 times 8 twelfths. We can put a 1 under the 20 and see 20 times 8 which is 160 in the numerator. 1 times 12 which is 12 in the denominator.

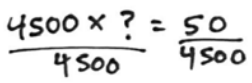


And now I have to divide 160 divided by 12 is 13.33. The interest it will earn in eight months will be $13.33.

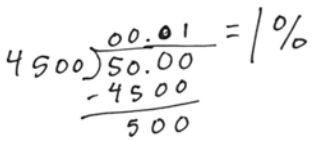
Let's Think (Slide 5): "Sometimes we will be asked to find the time or the original amount or the interest." This is still as simple as using the same equation. We will plug in the values we know and solve for the values we don't know. We know we have two equations. Let's assume we don't know which one to use so we just go with this one: ORIGINAL X PERCENT X TIME = INTEREST. That's no problem but I might need to do some extra work to the side to find all the values.



The original is $450. We don't know the percent. We know the time is 10 years. We also don't know the interest. We only know the final balance was $500. If I want to find the interest, I have to subtract the original amount. That's 500 minus 450, which is 50. $50 is the interest I will plug into my equation.



Now I can solve. I can do 450 times 10. It is 4,500 so let me rewrite my equation as 4,500 x question mark equals 50. To solve this, I will divide by 4,500 on both sides.



That is kind of tricky division. 4500 doesn't go into 5 or 50. If I put a decimal and two zeros, it doesn't go into 500. It only goes into 5000 once. So I put a 1. I subtract 4500 and I get 500 left. So that means my answer is 0.01 or 1%.

That makes sense to me because it was only a smaller amount of interest over so many years.

Let's Try It (Slide 6): Now we will practice some more problems. I will lead you through step by step.

WARM WELCOME

Today we will solve simple interest problems.

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Let's Review:

In real life, people are paid interest on money they save in a bank or they have to pay interest on loans they borrow.

Name the steps to make a table to find what happens if Lisa has a $100 credit card balance and she has to pay 10% interest each month.

Month	Interest	Balance
Jan	$10	$110
Feb	$20	$120
Jan	$30	$130

First, we find _____.

Then we _____.

Then we _____.

Let's Talk:

Sometimes the time we have to solve for might be a fractional amount.

A $1,000 savings bond earns simple interest at the rate of 2% per year. The interest is paid at the end of each month. How much interest will it earn in two years?

A $1,000 savings bond earns simple interest at the rate of 2% per year. The interest is paid at the end of each month. How much interest will it earn in eight months?

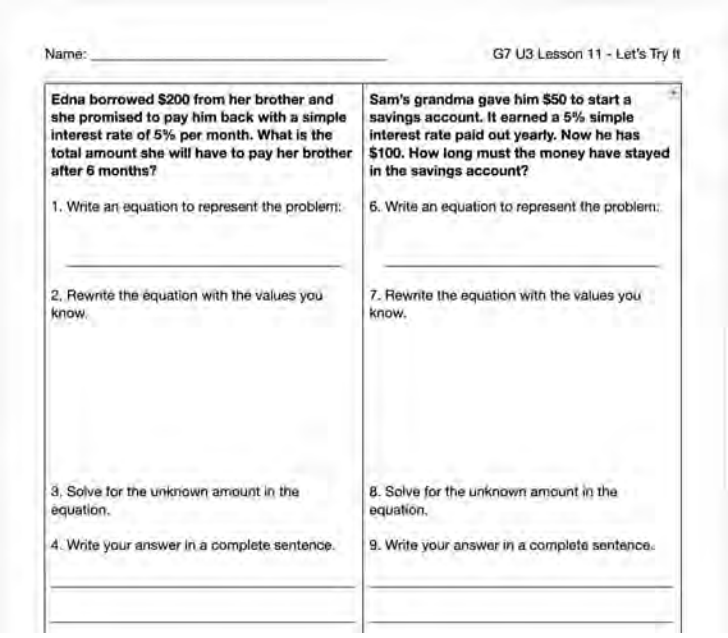
Let's Think:

Sometimes we will be asked to find the time or the original amount or the interest.

John had $450 in the bank. The balance earned interest every year for 10 years and now he has $500. What was the yearly interest rate?

Let's Try It:

We will do it together step by step!



Name: _____ G7 U3 Lesson 11 - Let's Try It

Edna borrowed $200 from her brother and she promised to pay him back with a simple interest rate of 5% per month. What is the total amount she will have to pay her brother after 6 months?	**Sam's grandma gave him $50 to start a savings account. It earned a 5% simple interest rate paid out yearly. Now he has $100. How long must the money have stayed in the savings account?**
1. Write an equation to represent the problem:	6. Write an equation to represent the problem:
2. Rewrite the equation with the values you know.	7. Rewrite the equation with the values you know.
3. Solve for the unknown amount in the equation.	8. Solve for the unknown amount in the equation.
4. Write your answer in a complete sentence.	9. Write your answer in a complete sentence.

On your Own:

Now it's time for you to do it on your own.

Name: _____ G7 U3 Lesson 11 - Independent Work

Solve each problem using an equation.

1. If you borrow $1500 at a simple interest rate of 6% for six months, how much interest will you owe when you pay back the loan?

2. Sarah deposits $300 into a college saving account that offers 4% simple interest each year. How much money will be in the account at the end of 2 years?

3. Jake borrowed $4000 to buy a car. When he paid back the loan three years later, he owed $150 in interest. He had a simple annual interest rate. What must the interest rate have been on the money Jake borrowed?

Edna borrowed $200 from her brother and she promised to pay him back with a simple interest rate of 5% per month. What is the total amount she will have to pay her brother after 6 months? 1. Write an equation to represent the problem: _____ 2. Rewrite the equation with the values you know. 3. Solve for the unknown amount in the equation. 4. Write your answer in a complete sentence. _____ _____ _____ 5. Does this amount seem reasonable? _____	**Sam's grandma gave him $50 to start a savings account. It earned a 5% simple interest rate paid out yearly. Now he has $100. How long must the money have stayed in the savings account?** 6. Write an equation to represent the problem: _____ 7. Rewrite the equation with the values you know. 8. Solve for the unknown amount in the equation. 9. Write your answer in a complete sentence. _____ _____ _____ 10. Does this amount seem reasonable? _____

Name: _____ G7 U3 Lesson 11 - Independent Work

Solve each problem using an equation.

1. If you borrow $1500 at a simple interest rate of 6% for six months, how much interest will you owe when you pay back the loan?

2. Sarah deposits $300 into a college saving account that offers 4% simple interest each year. How much money will be in the account at the end of 2 years?

3. Jake borrowed $4000 to buy a car. When he paid back the loan three years later, he owed $150 in interest. He had a simple annual interest rate. What must the interest rate have been on the money Jake borrowed?

4. Jane borrowed $120 from her brother. She promised to pay it back with a monthly simple interest rate of 5%. When she paid it back, she owed her brother $150. How many months must it have taken Jane to pay back her brother?

Solve each problem using an equation.

5. Lisa took out a 5 year loan with a yearly simple interest rate of 10%. When she paid back the loan, she owed $400 in interest. What must the value of the original loan have been?

6. Burt deposits $700 into a vacation fund that earns 3.5% simple interest each year. How much money will have in 3 years to go on his dream trip?

7. Micah borrows $1,800 to pay for home renovations at an interest rate of 6% per month for 9 months. How much interest will he owe at the end of the loan?

8. Alex borrowed $350 from his dad to cover a dentist bill. The loan has a monthly simple interest rate. After 4 months, Alex owes his dad $400. What must the interest rate have been?

Name: ANSWER KEY

Edna borrowed $200 from her brother and she promised to pay him back with a simple interest rate of 5% per month. What is the total amount she will have to pay her brother after 6 months?

1. Write an equation to represent the problem:

original x percent x time = interest

2. Rewrite the equation with the values you know.

$200 \times 0.05 \times 6 = ?$

$10 \times 6 = ?$

60

$200 \times 0.05 = 10.00$

3. Solve for the unknown amount in the equation.

4. Write your answer in a complete sentence.

She will have to pay her brother $60.

5. Does this amount seem reasonable? yes

Sam's grandma gave him $50 to start a savings account. It earned a 5% simple interest rate paid out yearly. Now he has $100. How long must the money have stayed in the savings account?

6. Write an equation to represent the problem:

original x percent x time = interest

7. Rewrite the equation with the values you know.

$50 \times 0.05 \times ? = 50$

$2.5 \times ? = 50$

$\frac{2.5 \times ?}{2.5} = \frac{50}{2.5}$

20

$100 - 50 = 50$

$50 \times 0.05 = 2.50$

$2.5 \overline{)50.0}$ → 020, 50, 000

8. Solve for the unknown amount in the equation.

9. Write your answer in a complete sentence.

The money must have stayed in the account for 20 years.

10. Does this amount seem reasonable? yes

Name: ANSWER KEY

G7 U3 Lesson 11 - Independent Work

Solve each problem using an equation.

1. If you borrow $1500 at a simple interest rate of 6% for six months, how much interest will you owe when you pay back the loan?

original × percent × time = interest

$1500 \times 0.06 \times 6 = ?$

$90 \times 6 = ?$

$1500 \times 0.06 = 90$

$90 \times 6 = 540$

$540 interest

2. Sarah deposits $300 into a college saving account that offers 4% simple interest each year. How much money will be in the account at the end of 2 years?

original × percent × time = interest

$300 \times 0.04 \times 2 = ?$

$12 \times 2 = ?$

$24 = ?$

$300 \times 0.04 = 12$

$300 + 24 = 324$

$324 in 2 years

3. Jake borrowed $4000 to buy a car. When he paid back the loan three years later, he owed $150 in interest. He had a simple annual interest rate. What must the interest rate have been on the money Jake borrowed?

original × percent × time = interest

$4000 \times ? \times 3 = 150$

$\frac{12000 \times ?}{12000} = \frac{150}{12000}$

$4000 \times 3 = 12000$

$150 \div 12000 = 0.012$

1.2%

4. Jane borrowed $120 from her brother. She promised to pay it back with a monthly simple interest rate of 5%. When she paid it back, she owed her brother $150. How many months must it have taken Jane to pay back her brother?

original × percent × time = interest

$120 \times 0.05 \times ? = 30$

$\frac{6 \times ?}{6} = \frac{30}{6}$

$150 - 120 = 30$

$120 \times 0.05 = 6$

5 months

Solve each problem using an equation.

5. Lisa took out a 5 year loan with a yearly simple interest rate of 10%. When she paid back the loan, she owed $400 in interest. What must the value of the original loan have been?

0.1 × 5 = 0.5

original × percent × time = interest

? × 0.1 × 5 = 400

$\frac{? \times 0.5}{0.5} = \frac{400}{0.5}$

0800
0.5)4000
-40
00

$800

6. Burt deposits $700 into a vacation fund that earns 3.5% simple interest each year. How much money will have in 3 years to go on his dream trip?

0.035 × 700 = 24.500

original × percent × time = interest

700 × 0.035 × 3 = ?

24.5 × 3 = ?

73.5 = ?

1 24.5 × 3 = 73.5

700.00 + 73.50 = 773.50

$773.50

7. Micah borrows $1,800 to pay for home renovations at an interest rate of 6% per month for 9 months. How much interest will he owe at the end of the loan?

1800 × 0.06 = 1400

original × percent × time = interest

1800 × 0.06 × 9 = ?

114 × 9 = ?

1 3 114 × 9 = 1026

$1,026

8. Alex borrowed $350 from his dad to cover a dentist bill. The loan has a monthly simple interest rate. After 4 months, Alex owes his dad $400. What must the interest rate have been?

2 350 × 4 = 1400

original × percent × time = interest

350 × ? × 4 = 50

$\frac{1400 \times ?}{1400} = \frac{50}{1400}$

0.03
1400)50.00
42 00
800

3%

3 400 − 350 = 50

G7 U3 Lesson 12

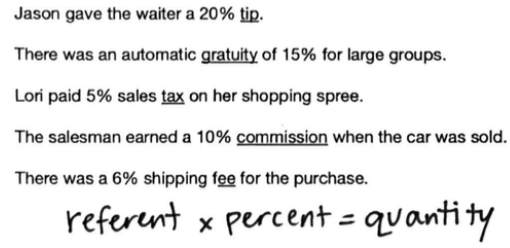
Understand problems about measurement error and use percentages to represent measurement error as percent error.

G7 U3 Lesson 12 - Today we will solve problems about commissions, taxes, and fees.

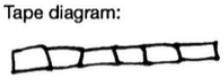
Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we will solve problems about commission, taxes, and fees.

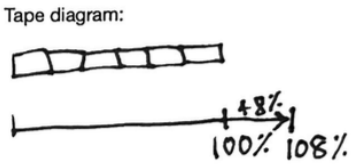
Let's Review (Slide 3): There are a lot of ways that percents show up in real life. Here are a few examples we haven't talked about yet. It says, "Jason gave the waiter a 20% tip." A tip is the extra amount added to a bill that goes straight to a waiter or service worker. The next one says, "There was an automatic gratuity of 15% for large groups." Gratuity is another word for tip. The next one says, "Lori paid 5% sales tax on her shopping spree." The government charges money on top of what we buy in order to pay for public goods like schools and roads. There are taxes on sales and property and income. The next one says, "The salesman earned a 10% commission when the car was sold." A commission is something someone earns for selling something. It is how salespeople get paid because then how much they earn is based on how much they sell. The next one says, "There was a 6% shipping fee for the purchase." A fee is an extra charge that is added onto a purchase price. All of these are just percent problems so the equation we've always used applies: REFERENT x PERCENT = QUANTITY.



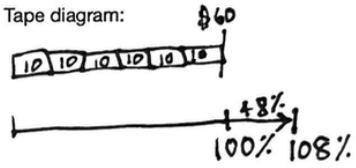
Let's Talk (Slide 4): We can draw a picture for these story problems just like we always do. Sometimes there might be multiple steps. Read along silently with me while I read out loud. *Read the story problem.* Let's draw a picture. It said, "Erin bought 6 new pairs of leggings." Let's draw 6 rectangles.



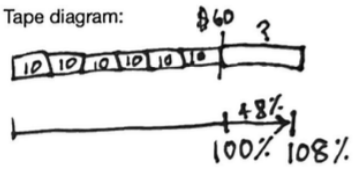
She was charged a shipping fee of 8%. Let's draw a percent line. We could call all these leggings 100% and then add a fee of 8% by drawing an arrow. That means this final point will be 108%. That's a little extra thinking that I'm doing for the problem but that's a good thing. I'm going to mark both of those numbers on my picture.



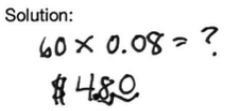
It says each pair of leggings cost $10. So I can write that in each box. There's some extra math I can do there too, right? 10 times 6 is 60 so I will mark that as the original price before the tax. That's what corresponds to 100%.



Now, we've already done some extra steps to solve this problem. Deciding where to put the question mark is going to be the key because that will help us figure out what percent to use - 8% or 108%.

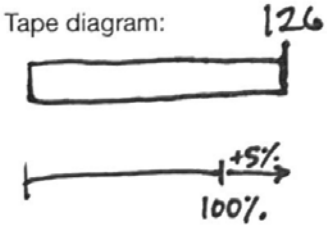


This problem asked how much Lisa paid for shipping so we will only want the shipping part not the whole final price. I will put the question mark here and I will use 8% which corresponds to it in the picture. If the question had asked for the final total then I would have put the question mark here. *Point to the total amount at the end of the bar.* And I would have used 108%.

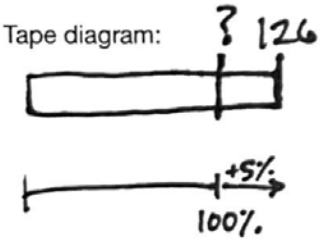


It's time for the equation: REFERENT x PERCENT = QUANTITY. That's 60 x 0.08 equals question mark. I can just do this multiplication here to the side. 60 times 8 is 480 and now I add the decimal point with two spaces after it. Lisa paid $4.80 for shipping.

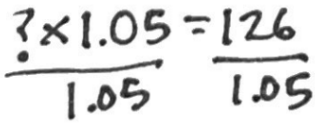
Let's Think (Slide 5): When we need to work backwards to find an original value, we will need to make sure we use the percent for the whole final amount. Read this story along with me silently while I read it out loud. *Read the story.* If I draw a picture for this, I will start to see that I want to work backwards from the final price. Let me show you what I mean. It says, "Faith paid a 5% cleaning fee." So I will draw a 100% line and then show an arrow for 5% more, which is the fee.



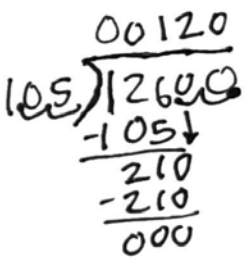
Now it also says, "she paid a final amount of $126 per night." That's the final amount so that lines up with the end of my percent like this. It's not the 100%. It's the 100% plus the fee.



The question asked, "what was the cost per night before the fee?" I will put my question mark here to represent the cost before the fee. Now here's the key idea: I DON'T want to use the 5% because that will just represent the fee alone and I actually don't know what that fee is. I can't figure it out unless I know the original price. I am going to have to use a percent that represents the final whole amount. I am going to put a line where that is. I need THAT percent. It is 100 plus 5 so 105%. That is the percent that I will need to use because it corresponds to the information I do have, the final cost of $126.



Now we can do our equation, REFERENT x PERCENT = QUANTITY. I don't know the referent which is the original amount. That's what I'm trying to find. It will be question mark times 1.05 NOT 0.05 equals 126. To solve this, I will have to divide by 1.05.



I am going to do that on the side of my paper. 126 divided by 1.05. I can't divide by a decimal so I have to shift the decimal for both numbers two spaces. So that's 12600 divided by 105. 105 doesn't go into 1 so I put a zero. It doesn't go into 12 so I put a zero. It's goes into 126 one time. I subtract 105 and get 21. Pull down a zero and it goes in two times. Subtract 210 and there's nothing left. This last space will be a zero. I get $120. That makes sense. There was a lower price and then the fee was added.

Let's Try It (Slide 6): Now we will practice some more problems. I will lead you through step by step.

WARM WELCOME

Today we will solve problems about commissions, taxes, and fees.

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Let's Review:

There are a lot of ways that percents show up in real life.

Jason gave the waiter a 20% tip.

There was an automatic gratuity of 15% for large groups.

Lori paid 5% sales tax on her shopping spree.

The salesman earned a 10% commission when the car was sold.

There was a 6% shipping fee for the purchase.

Let's Talk:

We can draw a picture for these story problems just like we always do.

Sometimes there might be multiple steps. Try this one: Erin bought 6 new pairs of leggings. She was charged a shipping fee of 8%. If each pair of leggings cost $10, who much did Lisa pay for shipping?

Tape diagram:

Solution:

Let's Think:

When we need to work backwards to find an original value, we will need to make sure we use the percent for the whole final amount.

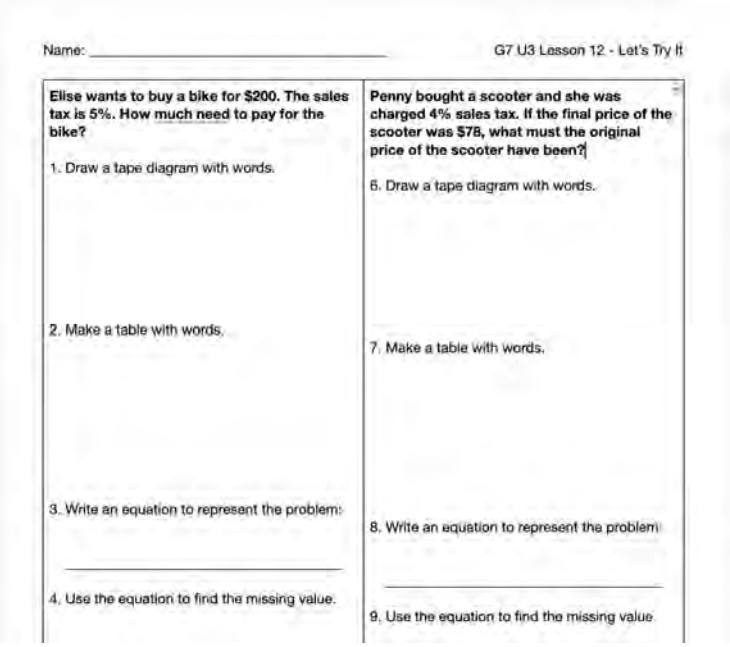
Faith paid a 5% cleaning fee on top of the nightly cost for a home rental. If she paid a final amount of $126 per night, what was the cost per night before the fee?

Tape diagram:

Solution:

Let's Try It:

We will do it together step by step!



Name: _____ G7 U3 Lesson 12 - Let's Try It

Elise wants to buy a bike for $200. The sales tax is 5%. How much need to pay for the bike?

1. Draw a tape diagram with words.

2. Make a table with words.

3. Write an equation to represent the problem:

_____

4. Use the equation to find the missing value.

Penny bought a scooter and she was charged 4% sales tax. If the final price of the scooter was $78, what must the original price of the scooter have been?

6. Draw a tape diagram with words.

7. Make a table with words.

8. Write an equation to represent the problem

_____

9. Use the equation to find the missing value

On your Own:

Now it's time for you to do it on your own.

Name: _____ G7 U3 Lesson 12 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. Alex sells his artwork through the gallery and pays a 20% fee on the selling price of $500 per painting. How much money does he pay in fees if he sells 10 paintings? Tape diagram:	Solution: Final answer: _____
2. Beth had a $40 restaurant bill but she paid $48 because she added a tip. What percent tip did Beth leave for the waiter? Tape diagram:	Solution: Final answer: _____
3. There is an automatic gratuity of 20% added onto any restaurant bill with five or more people. If a table had a $120 bill, what would be the final charge? Tape diagram:	Solution:

Elise wants to buy a bike for $200. The sales tax is 5%. How much need to pay for the bike?

1. Draw a tape diagram with words.

2. Make a table with words.

3. Write an equation to represent the problem:

_____

4. Use the equation to find the missing value.

5. Write your answer in a complete sentence.

_____

_____

_____

Penny bought a scooter and she was charged 4% sales tax. If the final price of the scooter was $78, what must the original price of the scooter have been?

6. Draw a tape diagram with words.

7. Make a table with words.

8. Write an equation to represent the problem:

_____

9. Use the equation to find the missing value.

10. Write your answer in a complete sentence.

_____

_____

_____

Name: _____ G7 U3 Lesson 12 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. Alex sells his artwork through the gallery and pays a 20% fee on the selling price of $500 per painting. How much money does he pay in fees if he sells 10 paintings? Tape diagram:	Solution: Final answer: _____
2. Beth had a $40 restaurant bill but she paid $48 because she added a tip. What percent tip did Beth leave for the waiter? Tape diagram:	Solution: Final answer: _____
3. There is an automatic gratuity of 20% added onto any restaurant bill with five or more people. If a table had a $120 bill, what would be the final charge? Tape diagram:	Solution: Final answer: _____
4. Meredith and her sister split the cost of a hotel room that cost $200 per night. There was a 10% room fee in addition to the cost. What was the total amount that each girl paid? Tape diagram:	Solution: Final answer: _____

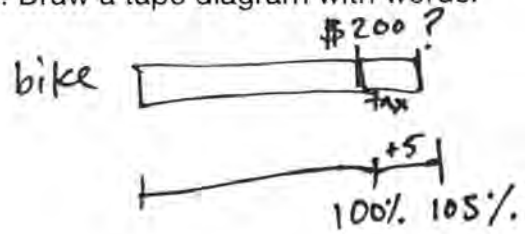
Solve each problem using an equation and a table.

5. Logan rents a car and is charged a 5% fee for a late return. If the fee was $100, what must the total cost of the rental have been? Tape diagram:	Solution: Final answer: _____
6. Lisa bought a hat for $30. The final cost with taxes was $33. How much was Lisa charged in taxes? Tape diagram:	Solution: Final answer: _____
7. Karen bought a house for 1.2 million dollars. The realtor earned a commission of 3% on the sale. How much money did the realtor earn? Tape diagram:	Solution: Final answer: _____
8. Jake paid a final price of $675 for his new phone. This included an 8% sales tax. What was the selling price of Jack's phone before taxes? Tape diagram:	Solution: Final answer: _____

Name: ANSWER KEY

Elise wants to buy a bike for $200. The sales tax is 5%. How much need to pay for the bike?

1. Draw a tape diagram with words.



2. Make a table with words.

price	price with tax
200	?
100	105

3. Write an equation to represent the problem:

price × percent = price w/ tax

4. Use the equation to find the missing value.

200 × 1.05 = ?

210 = ?

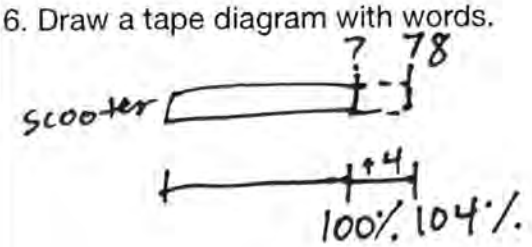
105 × 200 = 21000

5. Write your answer in a complete sentence.

Elise will need to pay $210 for the bike.

Penny bought a scooter and she was charged 4% sales tax. If the final price of the scooter was $78, what must the original price of the scooter have been?

6. Draw a tape diagram with words.



7. Make a table with words.

price	price with tax
?	78
100	104

8. Write an equation to represent the problem:

price × percent = price w/ tax

9. Use the equation to find the missing value.

$\frac{? \times 1.04}{1.04} = \frac{75}{1.04}$

$72

1.04 | 75.00 → 72

10. Write your answer in a complete sentence.

The original price must have been about $72.

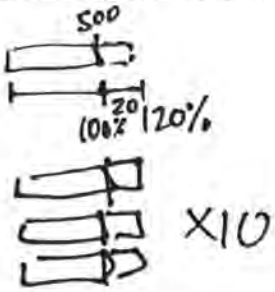
Name: ANSWER KEY

G7 U3 Lesson 12 - Independent Work

Solve each problem using a tape diagram, a table and an equation.

1. Alex sells his artwork through the gallery and pays a 20% fee on the selling price of $500 per painting. How much money does he pay in fees if he sells 10 paintings?

Tape diagram:



Solution:

$500 \times 1.2 = ?$

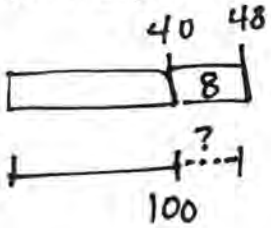
$600 \times ? = 600 \times 10 = 6000$

$1.2 \times 500 = 600.0$

Final answer: $6000

2. Beth had a $40 restaurant bill but she paid $48 because she added a tip. What percent tip did Beth leave for the waiter?

Tape diagram:



Solution:

$40 \times ? = 8$

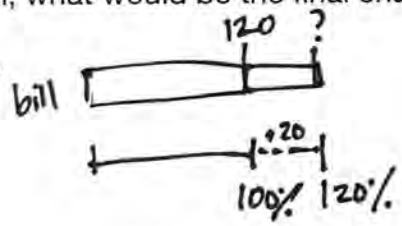
$\frac{40 \times ?}{40} = \frac{8}{40}$

$40 \overline{)8.00}$ -80 00 → 0.20

Final answer: 20%

3. There is an automatic gratuity of 20% added onto any restaurant bill with five or more people. If a table had a $120 bill, what would be the final charge?

Tape diagram:



Solution:

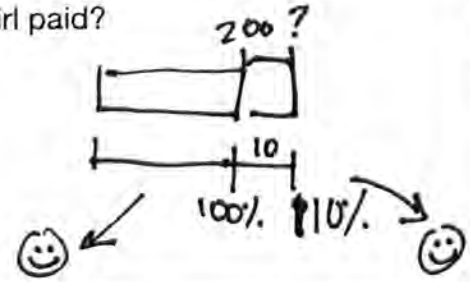
$120 \times 1.2 = ?$

$120 \times 1.2 = 144.0$

Final answer: $144

4. Meredith and her sister split the cost of a hotel room that cost $200 per night. There was a 10% room fee in addition to the cost. What was the total amount that each girl paid?

Tape diagram:



Solution: $200 \times 1.1 = ?$

$200 \times 1.1 = 220.0$

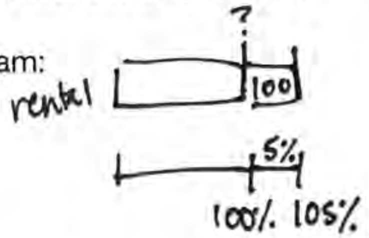
$2 \overline{)220}$ -2 02 -2 → 110

Final answer: $110

Solve each problem using an equation and a table.

5. Logan rents a car and is charged a 5% fee for a late return. If the fee was $100, what must the total cost of the rental have been?

Tape diagram:



Solution:

$$\frac{? \times 0.05}{0.05} = \frac{100}{0.05}$$

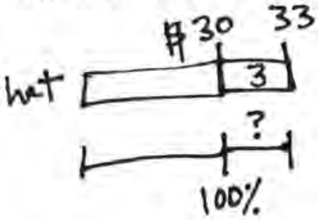
$0.05 \overline{)100.00}$ = 02000; −10, 000

2000 + 100 = 2100

Final answer: $2100

6. Lisa bought a hat for $30. The final cost with taxes was $33. How much was Lisa charged in taxes?

Tape diagram:



Solution:

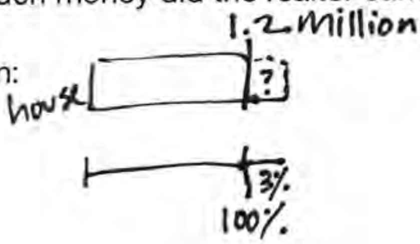
$$\frac{30 \times ?}{30} = \frac{3}{30}$$

$30 \overline{)3.00}$ = 0.10; −30, 00

Final answer: 10%

7. Karen bought a house for 1.2 million dollars. The realtor earned a commission of 3% on the sale. How much money did the realtor earn?

Tape diagram:



Solution:

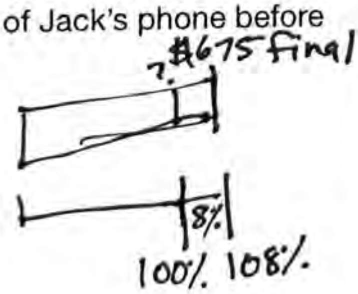
$1.2 \times 0.03 = ?$

1.2 × .03 = .036

Final answer: .036 million

8. Jake paid a final price of $675 for his new phone. This included an 8% sales tax. What was the selling price of Jack's phone before taxes?

Tape diagram:



Solution:

$$\frac{? \times 1.08}{1.08} = \frac{675}{1.08}$$

$1.08 \overline{)675.00}$ = 00625; −648, 270, −216, 540, −540, 000

Final answer: $625

G7 U3 Lesson 13

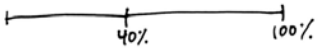
Solve and interpret problems that involve percent error by finding the correct amount, erroneous amount, or percent error.

G7 U3 Lesson 13 - Today we will use mental math to solve percent problems.

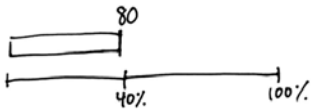
Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we will use mental math to solve percent problems.

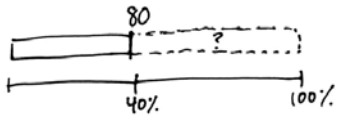
Let's Review (Slide 3): We have been using equation to solve percent problems for this whole unit.



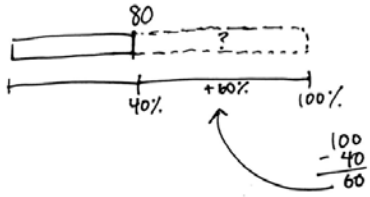
Read this problem silently while I read it out loud. *Read the problem out loud.* The first thing we do is draw a picture. We don't get any numerical information in the second sentence so I will draw the second sentence, "she has finished 40%."



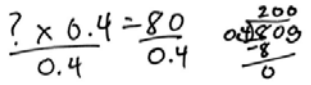
Then it says, "Holly has read 80 pages" so that's 40% that she finished is also the 80 pages that she finished. I will draw a rectangle to correspond to 40%.



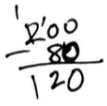
The question is asking, "how many more pages does she need to read?" So I don't want the total amount. I just want the amount that is more. I will mark that with a question mark here.



I don't have a percent for the amount that corresponds to that question mark so I have to subtract to find it. 100 minus 40 is 60% so the percent increase is 60%.

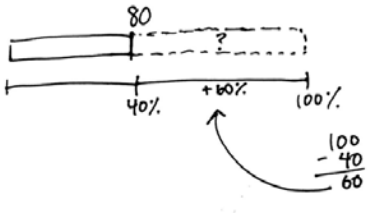


Even now, I don't have enough information to set up an equation for that question mark. I can set up a different equation to find the total amount. I'll mark that question mark. I would do question mark times 0.4 = 80. Divide by 0.4 on both sides and I get 200.

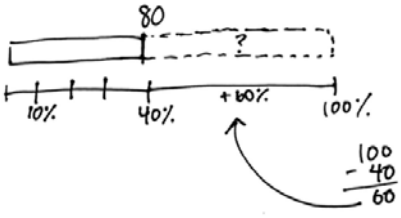


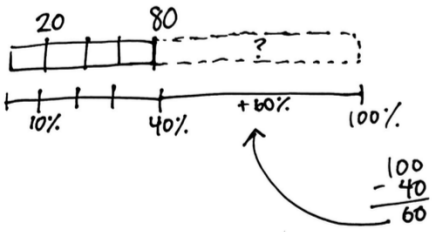
And now I can do 200 minus 80 to get this difference, which would be 120 pages. That's a lot of steps. Today we're trying to figure out how we can do some of the math in our heads. So let's try this problem again with mental math.

Let's Talk (Slide 4): If we think of our problem as a proportion, we can solve it in our heads by doing the same operation to both parts. This is the same problem that we just read. But now I'm going to draw a slightly larger picture to show our reasoning. And we're going to do all the calculations in our heads. First of all, it is the same word problem so it makes sense that the picture would start off the same.

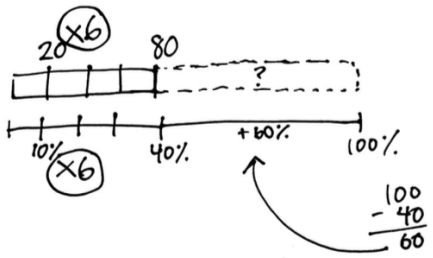


But now, instead of setting up an equation, I am going to look at these numbers and think about whether there is a common factor that I could figure out mentally for all these numbers. The vocabulary makes this seems more complicated that it really is. But basically I'm looking at 40 and 80 and 100 and thinking, "10 goes into all of those numbers." So, if I can figure out 10% then I can figure out all the other values. 40% divided by 4 is 10. Let me mark that on my picture.

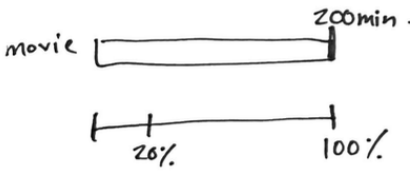




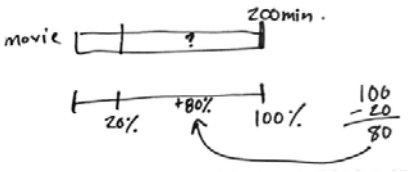
Since we are thinking of these as proportions then whatever I do to one line, I do to the other. So I am going to do 80 divided by 4 too. 80 divided by 4 is 20.



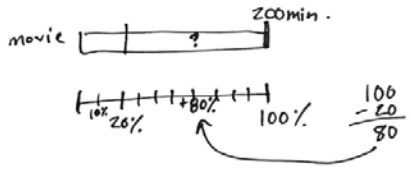
Now I can work my way up to 60%. 10% times 6 would make 60 so I have to do 20 pages x 6 which is 120.



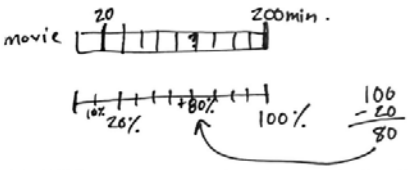
Let's Think (Slide 5): Let's do one more. This is the big idea we're going to keep in mind. We just operate on our quantities together to keep them in proportion. Read this problem silently while I read it out loud. *Read the problem*. Let's start by drawing 200 minutes. Next I am going to draw the 20% out of 100%.



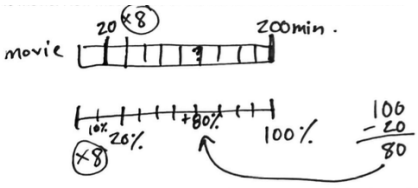
The question is asking for how much MORE Sue has to watch so I need the increase as a percent. 100 minus 20 is 80% so the increase is 80%. And I am going to draw a corresponding question mark on my bar where I want to find the number of additional pages.



Instead of setting up an equation, let's see if we can use mental math. 10% is still a really nice common factor. But this time, we don't know what the 20% corresponds to. We know what the 100% corresponds to. So let's divided that. 100% divided by 10 is 10%.



So I will do 200 minutes divided by 10 is 20 minutes. 10% corresponds to 20 minutes.



If I want to turn that into 80%, I will have to do "times 8. 10% times 8 is 80% so 20 pages x 8 is 160 pages. That's our answer.

Let's Try It (Slide 6): Now we will practice some more problems. I will lead you through step by step.

WARM WELCOME

Today we will use mental math to solve percent problems.

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Let's Review:

We have been using equations to solve percent problems for this whole unit.

Holly is trying to finish a novel before her book club meeting. So far, she has finished 40%. If Holly has read 80 pages, how many more pages does she need to read?

Tape diagram: Table: Equation:

Let's Talk:

If we think of our problem as a proportion, we can solve it in our heads by doing the same operation to both parts.

Holly is trying to finish a novel before her book club meeting. So far, she has finished 40%. If Holly has read 80 pages, how many many pages does she need to read?

Let's draw a larger picture that we can mark up to show our reasoning:

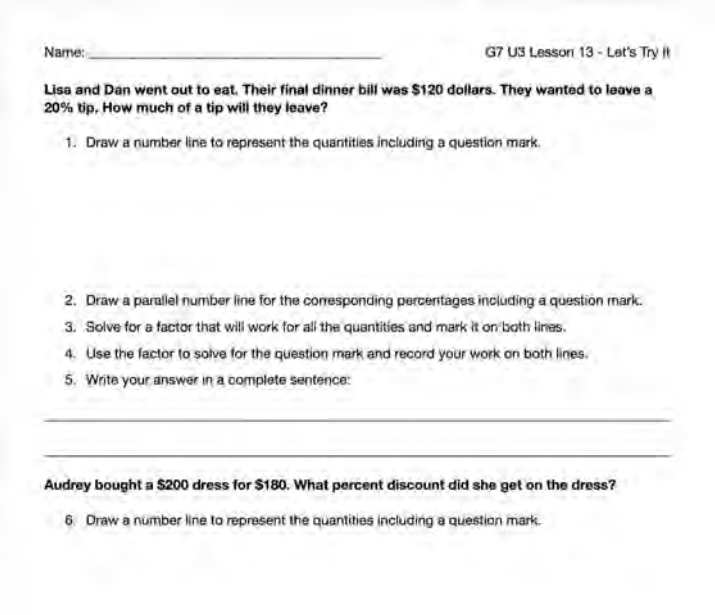
Let's Think:

We must operate on our quantities and percents together to keep them in proportion.

Sue is watching a movie that is 200 minutes long. So far she's watched 20% of the movie. How much more of the movie does Sue have to watch?

Let's Try It:

We will do it together step by step!



Name: _____ G7 U3 Lesson 13 - Let's Try It

Lisa and Dan went out to eat. Their final dinner bill was $120 dollars. They wanted to leave a 20% tip. How much of a tip will they leave?

1. Draw a number line to represent the quantities including a question mark.

2. Draw a parallel number line for the corresponding percentages including a question mark.
3. Solve for a factor that will work for all the quantities and mark it on both lines.
4. Use the factor to solve for the question mark and record your work on both lines.
5. Write your answer in a complete sentence:

_____

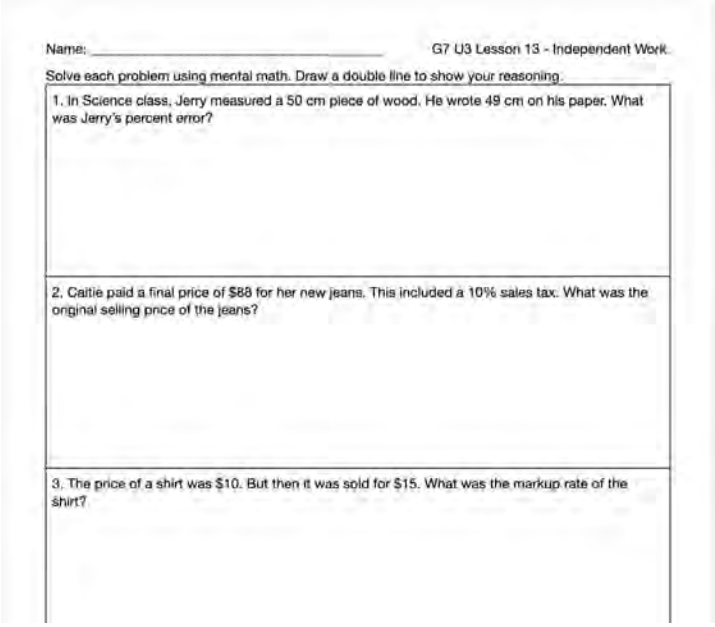
_____

Audrey bought a $200 dress for $180. What percent discount did she get on the dress?

6. Draw a number line to represent the quantities including a question mark.

On your Own:

Now it's time for you to do it on your own.



Name: _____ G7 U3 Lesson 13 - Independent Work

Solve each problem using mental math. Draw a double line to show your reasoning.

1. In Science class, Jerry measured a 50 cm piece of wood. He wrote 49 cm on his paper. What was Jerry's percent error?

2. Caitie paid a final price of $88 for her new jeans. This included a 10% sales tax. What was the original selling price of the jeans?

3. The price of a shirt was $10. But then it was sold for $15. What was the markup rate of the shirt?

Lisa and Dan went out to eat. Their final dinner bill was $120 dollars. They wanted to leave a 20% tip. How much of a tip will they leave?

1. Draw a number line to represent the quantities including a question mark.

2. Draw a parallel number line for the corresponding percentages including a question mark.
3. Solve for a factor that will work for all the quantities and mark it on both lines.
4. Use the factor to solve for the question mark and record your work on both lines.
5. Write your answer in a complete sentence:

_____

_____

Audrey bought a $200 dress for $180. What percent discount did she get on the dress?

6. Draw a number line to represent the quantities including a question mark.

7. Draw a parallel number line for the corresponding percentages including a question mark.
8. Solve for a factor that will work for all the quantities and mark it on both lines.
9. Use the factor to solve for the question mark and record your work on both lines.
10. Write your answer in a complete sentence:

_____

_____

Name: _____ G7 U3 Lesson 13 - Independent Work

Solve each problem using mental math. Draw a double line to show your reasoning.

1. In Science class, Jerry measured a 50 cm piece of wood. He wrote 49 cm on his paper. What was Jerry's percent error?

2. Caitie paid a final price of $88 for her new jeans. This included a 10% sales tax. What was the original selling price of the jeans?

3. The price of a shirt was $10. But then it was sold for $15. What was the markup rate of the shirt?

4. The height of a tree was 25% higher than its height the previous year. If the tree is 40 feet tall, how tall was it in the previous year?

Solve each problem using mental math. Draw a double line to show your reasoning.

5. An electronics store marked down the price of a TV by 20% and Lisa bought it for $160. What was the original price of the TV?

6. Lisa can ride her bike as fast as 8 miles per hour. Her goal is to be able to ride it as fast as 12 miles per hour. What percent increase does Lisa need to meet her goal?

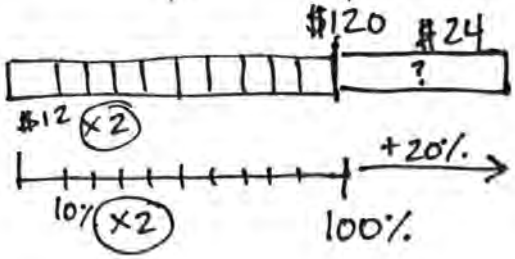
7. Jojo wants to buy a Lego set that costs $300. So far she has saved 60% of the price. How much has Jojo saved?

8. Sarah solved 20 math problems. Michael solved 24 math problems. What percent of Sarah's problems did Michael solve?

Name: ANSWER KEY

Lisa and Dan went out to eat. Their final dinner bill was $120 dollars. They wanted to leave a 20% tip. How much of a tip will they leave?

1. Draw a number line to represent the quantities including a question mark.

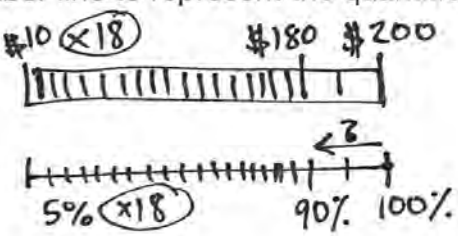


2. Draw a parallel number line for the corresponding percentages including a question mark.
3. Solve for a factor that will work for all the quantities and mark it on both lines.
4. Use the factor to solve for the question mark and record your work on both lines.
5. Write your answer in a complete sentence:

They will leave a $24 tip.

Audrey bought a $200 dress for $180. What percent discount did she get on the dress?

6. Draw a number line to represent the quantities including a question mark.



200 ÷ 20 = 10

100 ÷ 20 = 5

4
18
× 5
90

7. Draw a parallel number line for the corresponding percentages including a question mark.
8. Solve for a factor that will work for all the quantities and mark it on both lines.
9. Use the factor to solve for the question mark and record your work on both lines.
10. Write your answer in a complete sentence:

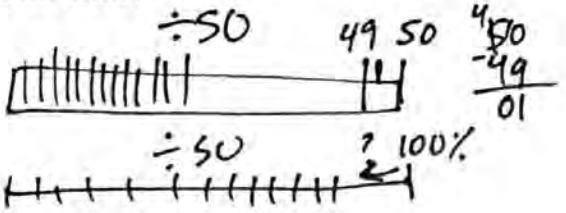
Lisa got a 10% discount.

Name: ANSWER KEY

G7 U3 Lesson 13 - Independent Work

Solve each problem using mental math. Draw a double line to show your reasoning.

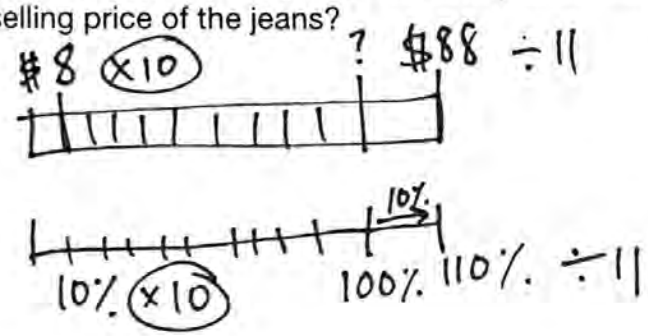
1. In Science class, Jerry measured a 50 cm piece of wood. He wrote 49 cm on his paper. What was Jerry's percent error?



$$\begin{array}{r} 50 \\ -49 \\ \hline 01 \end{array}$$

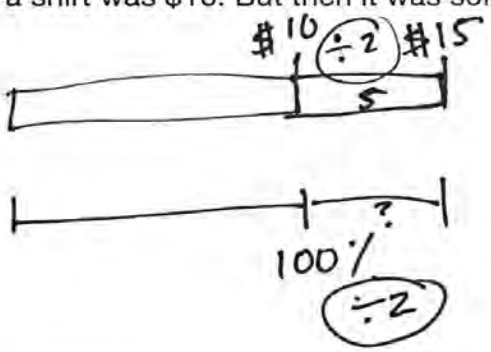
100% ÷ 50 = 2%

2. Caitie paid a final price of $88 for her new jeans. This included a 10% sales tax. What was the original selling price of the jeans?



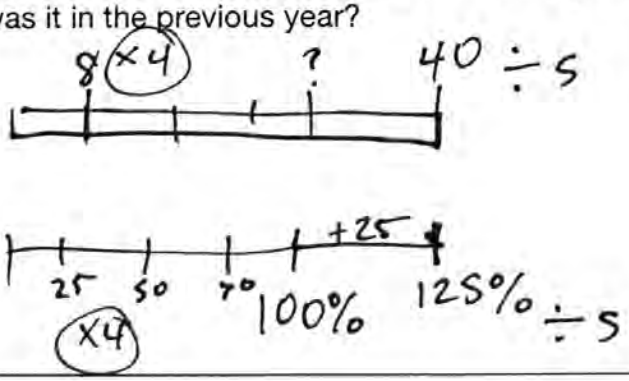
$80

3. The price of a shirt was $10. But then it was sold for $15. What was the markup rate of the shirt?



100% ÷ 2 = 50%

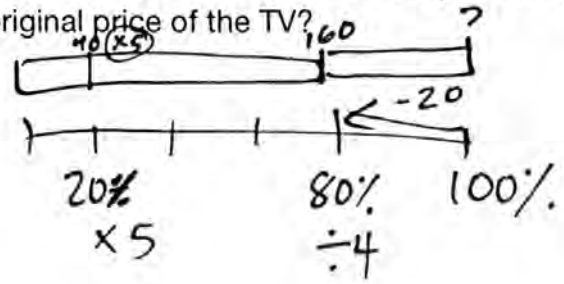
4. The height of a tree was 25% higher than its height the previous year. If the tree is 40 feet tall, how tall was it in the previous year?



32 feet tall

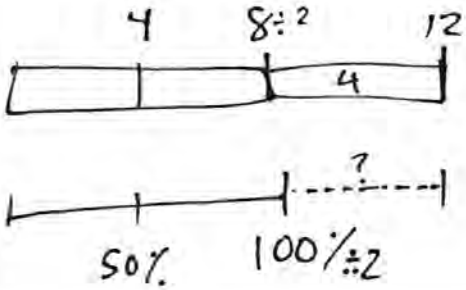
Solve each problem using mental math. Draw a double line to show your reasoning.

5. An electronics store marked down the price of a TV by 20% and Lisa bought it for $160. What was the original price of the TV?



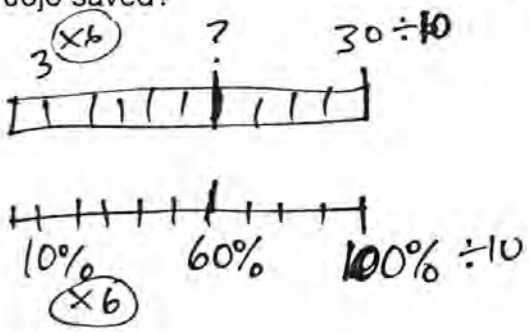
$200

6. Lisa can ride her bike as fast as 8 miles per hour. Her goal is to be able to ride it as fast as 12 miles per hour. What percent increase does Lisa need to meet her goal?



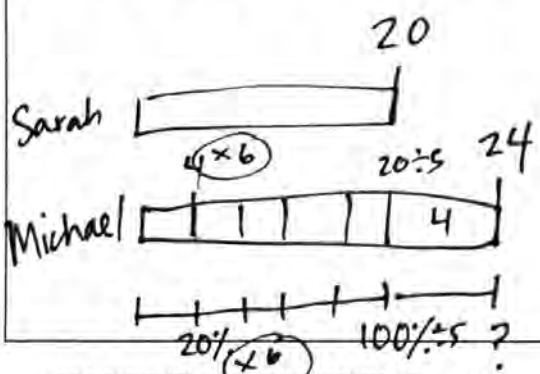
50%

7. Jojo wants to buy a Lego set that costs $300. So far she has saved 60% of the price. How much has Jojo saved?



$18

8. Sarah solved 20 math problems. Michael solved 24 math problems. What percent of Sarah's problems did Michael solve?



120%

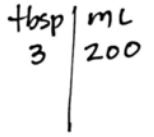
G7 U3 Lesson 14

Generate values that fall within the acceptable range for a measurement, given a maximum percent error and the correct value.

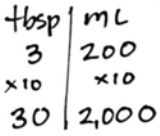
G7 U3 Lesson 14 - Today we will work with percentages that are not whole numbers.

Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we will work with percentages that are not whole numbers. We are going to use some related facts so we aren't doing a whole bunch of complicated place value multiplication. You might even be able to do it mentally like we did in our last lesson. I'll show you what I mean.

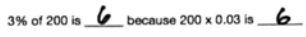


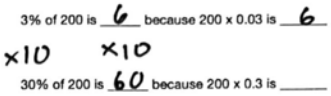
Let's Review (Slide 3): We already know that we multiply both parts of a proportion by the same number to preserve their relationship. Just like we multiply the top and bottom of a fraction to keep it equivalent. Read this problem along with me while I read it out. *Read the problem out loud.* The first thing that our table needs is words. And then I can put the numbers in place.

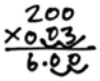


Now, the question is asking what she will need to make 10 servings. That means I'm going to need 10 times as many tablespoons and I'm also going to need 10 times as many milliliters. As long as I multiply both parts of this proportion, the relationship will stay the same. The cocoa will taste the same. So I need 30 tablespoons for 2,000 mL. We can apply this same idea to percents because they are proportions too.

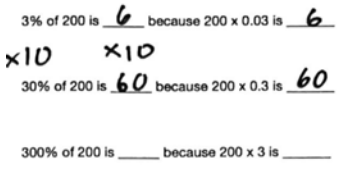
Let's Talk (Slide 4): It is especially easy to multiply percentages by powers of ten because we know from our place value chart that each time we multiply by ten we just shift the digits one place to the left. Let me know you how we use this. We'll just do the first one the regular way. 3% of 200 means we have to do 200 x 0.03. We multiply that all out and get 6.

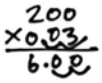




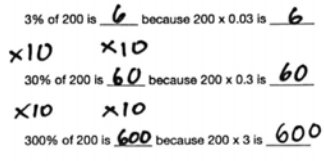


Now, if we wanted to find 30% of 200 instead, we can see that 3% times 10 so I'll do the 6 times 10 too. 30% of 200 is 60.





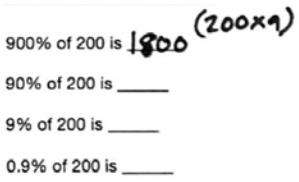
Let's do the multiplication on the side just to be sure. That would be 200 x 0.3. I will write all that out, and I really do get 60.



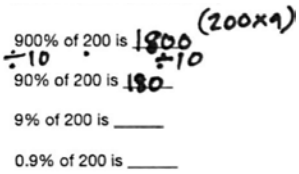
Now we can see how to figure out 300%. It's just 30% times 10, which means 60 times 10. 300% of 200 is 600.

So, I can always take a percent I know and multiply to find a percent I don't know. We did that in our last lesson too. And guess what?!?! If we can use multiplication then we can also use division!

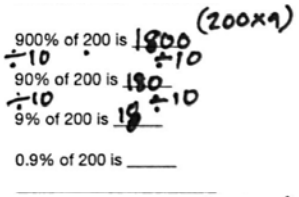
Let's Talk (Slide 5): Division is a great way to figure out percents less than 1 whole. This is going to be really useful because turning a super tiny percent into a decimal gets really messy and I don't feel like writing all that out anyway. So we're going to use division. And it is going to be easiest if we start with a nice big percent that is really easy to find. Believe it or not, in order to find 0.9%, I'm actually going to start with 900%. That's 900% is just 9. So if I want 900% of 200, I just do 200 times 9. I'm going to write that over to the side just so we know how we got this. But it's so easy - I can do that in my head. 200 times 9 is 1800.



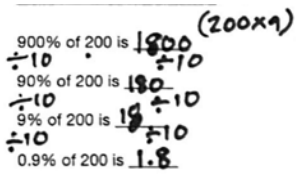
Now we just keep dividing by powers of ten to get down to 0.9%. If I want 90%, that's 900% divided by 10. I have to divide 1800 by 10 too. 90% of 200 is 180.



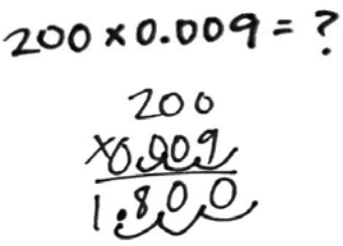
Keep going! 90% divided by 10 is 9% so I do 180 divided by 10 which is 18.



We're almost there! 9% divided by 10 would be 0.9% so I do 18 divided by 10 which is 1.8.

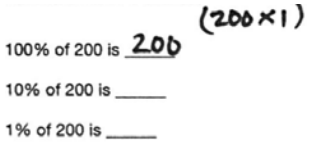


We were able to find a very teeny time percent without doing a lot of really complicated multiplication.

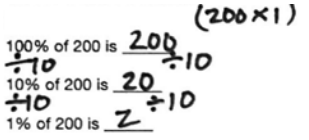


It's much easier to think of it as shifts of place value from whole number multiplication than to change the percent into decimal and multiplying because otherwise we end up with lots of zeros and scoops and it's tricky. Let me just show what it would have to be. 0.9% is less that 1% so it's very little it wouldn't by 0.09. That's 9%. It would be 0.009%. 200 x 0.0009 is 9 times 0 and 9 times 0 and 9 times 2 and then count up the decimal places and I end up with 1.8. Same answer. So it works. But I can do this proportional reasoning we just did earlier in my head.

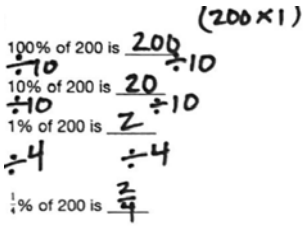
Let's do another example. We want to find $\frac{1}{4}$%. That's very small, right?



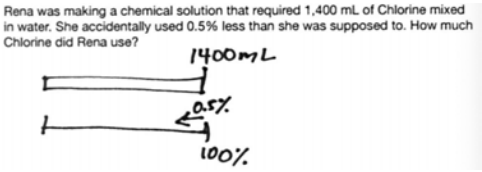
That's less than 1%. It's a fraction of a percent, which is already a hundredth. So it's a fraction of a hundredth. Phew! Let's start with something that really easy. 100% of 200 is the whole thing, right? It's 200. Or you could think of it as 200 x 1 if you really wanted to multiply. I'll write that to the side just to keep track of what the thinking was there.



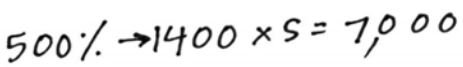
Now we can work our way closer to $\frac{1}{4}$%. Divide both of these by 10. Then 10% of 200 is 20. Divide both of these by 10 again. Then 1% of 200 is 2.



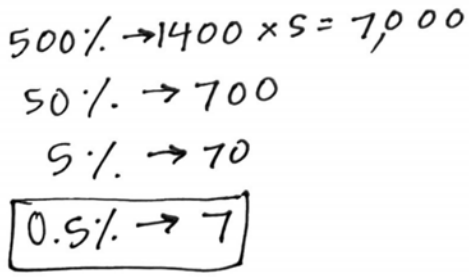
Now, if we want to turn 1% into $\frac{1}{4}$%, we just need to divide by 4. 2 divided by 4 is 2 fourths. You can imagine that if we wants to do this as multiplication we would have had to turn $\frac{1}{4}$ into 0.25 then done 0.25% which is 0.0025. It gets very cumbersome. It is better to start with a whole number and work our way down with division.



Let's Think (Slide 6): Now we can continue this proportional reasoning with percent word problems and understand how it really comes in hand. Read the problem silently while I read this out loud. *Read the problem.* We start with a picture. I will draw the 1,400 mL and mark the 100% and the 0.5% less. I need to find 0.5% of 1400.



That seems tricky so I'm going to start with 500% of 1400. That's just 1400 times 5 which is 7000.



Now I can work my way down with division. 500% divided by 10 is 50% while 7000 divided by 10 is 700. Then 50% divided by 10 is 5% while 700 divided by 10 is 70. Then 5% divided by 10 is 0.5% while 70 divided by 10 is 7. So 0.05% of 1400 is 7.

Let's Try It (Slide 7): Now we will practice some more problems. I will lead you through step by step.

WARM WELCOME

Today we will work with percentages that are not whole numbers.

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Let's Review:

We multiply both parts of a proportion by the same number to preserve their relationship.

Lisa puts 3 tablespoons of cocoa in 200 mL of milk to make 1 serving of hot chocolate. What will she need to make 10 servings? Make a table to show how to increase her recipe while keeping the proportion.

Let's Talk:

It is especially easy to multiply percentages by powers of ten.

3% of 200 is _____ because 200 x 0.03 is _____

30% of 200 is _____ because 200 x 0.3 is _____

300% of 200 is _____ because 200 x 3 is _____

Let's Talk:

Division is a great way to figure out percents less than 1 whole.

900% of 200 is _____

90% of 200 is _____

9% of 200 is _____

0.9% of 200 is _____

100% of 200 is _____

10% of 200 is _____

1% of 200 is _____

$\frac{1}{4}$% of 200 is _____

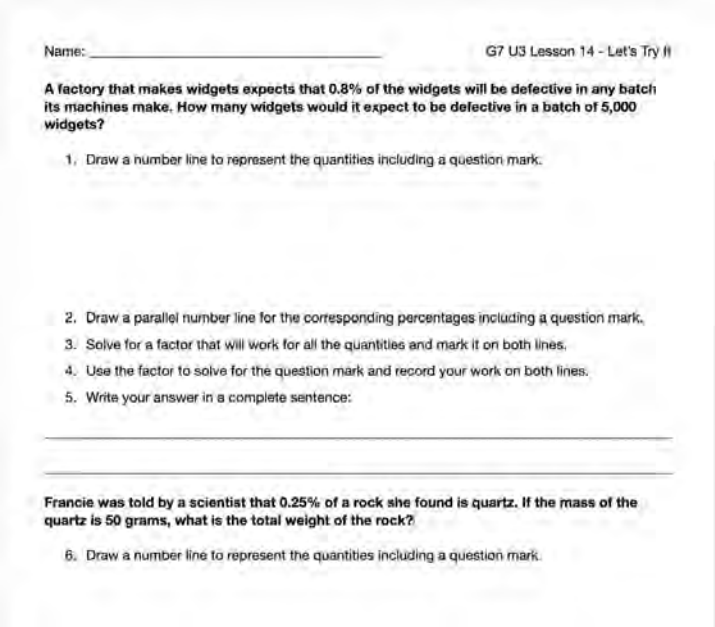
Let's Think:

We can continue this proportional reasoning with percent word problems.

Rena was making a chemical solution that required 1,400 mL of Chlorine mixed in water. She accidentally used 0.5% less than she was supposed to. How much Chlorine was Rena short?

Let's Try It:

We will do it together step by step!



Name: _____ G7 U3 Lesson 14 - Let's Try It

A factory that makes widgets expects that 0.8% of the widgets will be defective in any batch its machines make. How many widgets would it expect to be defective in a batch of 5,000 widgets?

1. Draw a number line to represent the quantities including a question mark.

2. Draw a parallel number line for the corresponding percentages including a question mark.
3. Solve for a factor that will work for all the quantities and mark it on both lines.
4. Use the factor to solve for the question mark and record your work on both lines.
5. Write your answer in a complete sentence:

_____

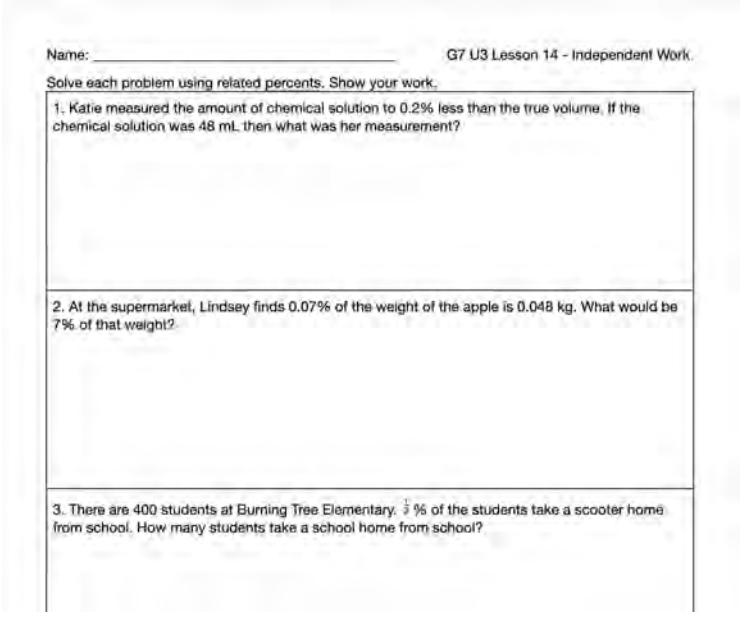
_____

Francie was told by a scientist that 0.25% of a rock she found is quartz. If the mass of the quartz is 50 grams, what is the total weight of the rock?

6. Draw a number line to represent the quantities including a question mark.

On your Own:

Now it's time for you to do it on your own.



Name: _____ G7 U3 Lesson 14 - Independent Work

Solve each problem using related percents. Show your work.

1. Katie measured the amount of chemical solution to 0.2% less than the true volume. If the chemical solution was 48 mL then what was her measurement?

2. At the supermarket, Lindsey finds 0.07% of the weight of the apple is 0.048 kg. What would be 7% of that weight?

3. There are 400 students at Burning Tree Elementary. $\frac{1}{2}$ % of the students take a scooter home from school. How many students take a school home from school?

A factory that makes widgets expects that 0.8% of the widgets will be defective in any batch its machines make. How many widgets would it expect to be defective in a batch of 5,000 widgets?

1. What percent would be easiest to find? _____

2. Draw a tape diagram to show the relationships in the problem with a question mark.

3. Which approach makes sense for this problem?

   (a) Find a related percent and divide down
   (b) Multiply the percent up.

4. Show you work.

5. Write your answer in a complete sentence:

_____

_____

Francie was told by a scientist that 0.25% of a rock she found is quartz. If the mass of the quartz is 50 grams, what is the total weight of the rock?

6. What percent would be easiest to find? _____

7. Draw a tape diagram to show the relationships in the problem with a question mark.

8. Which approach makes sense for this problem?

    (a) Find a related percent and divide down
    (b) Multiply the percent up.

9. Show you work.

10. Write your answer in a complete sentence:

_____

_____

Name: _____ G7 U3 Lesson 14 - Independent Work

Solve each problem using related percents. Show your work.

1. Katie measured the amount of chemical solution to 0.2% less than the true volume. If the chemical solution was 48 mL then what was her measurement?

2. At the supermarket, Lindsey finds 0.07% of the weight of the apple is 0.048 kg. What would be 7% of that weight?

3. There are 400 students at Burning Tree Elementary. $\frac{1}{2}$ % of the students take a scooter home from school. How many students take a school home from school?

4. Cleveland was told that his newborn puppy was 0.8% of the total weight he would be when he was fully grown. If the dog weighs 6 ounces now, how much will it weigh when it is fully grown?

Solve each problem using related percents. Show your work.

5. In the entire 800 person population of the school, only $\frac{1}{4}$% chose fencing as their favorite sport. How many students chose fencing as their favorite sport?

6. Jenny can drive 1 mile on 0.2% of the gas in the gas tank of her car. How far can Jenny drive on a full tank of gas?

7. An investment portfolio of $1,000 is expected to yield 0.3% annually. How much money would one expect the portfolio to earn in a year?

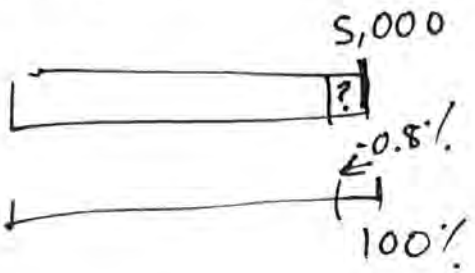
8. A swimming pool loses water at a rate of 0.75% per day due to evaporation. How much water will the pool lose if it has 50,000 liters of water?

Name: ANSWER KEY

A factory that makes widgets expects that 0.8% of the widgets will be defective in any batch its machines make. How many widgets would it expect to be defective in a batch of 5,000 widgets?

1. What percent would be easiest to find? 800%

2. Draw a tape diagram to show the relationships in the problem with a question mark.



0.8% of 5,000

3. Which approach makes sense for this problem?

   (a) Find a related percent and divide down
   (b) Multiply the percent up.

4. Show you work.

800% of 5,000 is 40,000
80% of 5,000 is 4,000
8% of 5,000 is 400
0.8% of 5,000 is 40

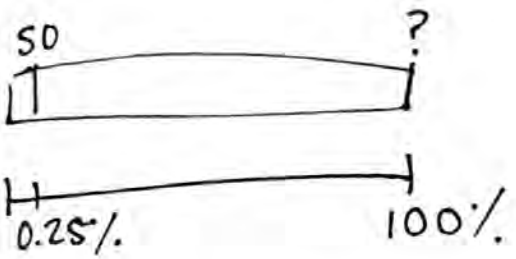
5. Write your answer in a complete sentence:

The factory should expect 40 widgets to be defective.

Francie was told by a scientist that 0.25% of a rock she found is quartz. If the mass of the quartz is 50 grams, what is the total weight of the rock?

6. What percent would be easiest to find? 25%

7. Draw a tape diagram to show the relationships in the problem with a question mark.



8. Which approach makes sense for this problem?

   (a) Find a related percent and divide down
   (b) Multiply the percent up.

9. Show you work.

0.25% is 50
2.5% is 500
25% is 5,000
×4 ×4
100% is 20,000

10. Write your answer in a complete sentence:

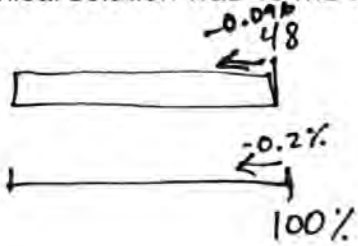
The total weight of the rock is 20,000 grams.

Name: ANSWER KEY

G7 U3 Lesson 14 - Independent Work

Solve each problem using related percents. Show your work.

1. Katie measured the amount of chemical solution to 0.2% less than the true volume. If the chemical solution was 48 mL then what was her measurement?



0.2% of 48

$$\begin{array}{r} 48.000 \\ -\ 0.096 \\ \hline 47.904 \end{array}$$

200% of 48 is 96
20% of 48 is 9.6
2% of 48 is 0.96
0.2% of 48 is 0.096

2. At the supermarket, Lindsey finds 0.07% of the weight of the apple is 0.048 kg. What would be 7% of that weight?

0.07% is 0.048
0.7% is 0.48
7% is 4.8 kg

3. There are 400 students at Burning Tree Elementary. $\frac{1}{2}$ % of the students take a scooter home from school. How many students take a school home from school?

$\frac{1}{2}$ % of 400

100% of 400 is 400
10% of 400 is 40
1% of 400 is 4
$\frac{1}{4}$% of 400 is 1

4. Cleveland was told that his newborn puppy was 0.5% of the total weight he would be when he was fully grown. If the dog weighs 6 ounces now, how much will it weigh when it is fully grown?

0.5% is 6
5% is 60
50% is 600
100% is **1200 ounces**

Solve each problem using related percents. Show your work.

5. In the entire 800 person population of the school, only $\frac{1}{4}$% chose fencing as their favorite sport. How many students chose fencing as their favorite sport?

$\frac{1}{4}$% of 800

100% of 800 is 800
10% of 800 is 80
1% of 800 is 8
$\frac{1}{4}$% of 800 is 2

6. Jenny can drive 1 mile on 0.2% of the gas in the gas tank of her car. How far can Jenny drive on a full tank of gas?

0.2% is 1 mile
2% is 10 miles
20% is 100 miles
100% is 500 miles

7. An investment portfolio of $1,000 is expected to yield 0.3% annually. How much money would one expect the portfolio to earn in a year?

0.3% of 1,000

300% of 1,000 is 3,000
30% of 1,000 is 300
3% of 1,000 is 30
0.3% of 1,000 is 3

8. A swimming pool loses water at a rate of 0.75% per day due to evaporation. How much water will the pool lose if it has 50,000 liters of water?

0.75% of 50,000

100% of 50,000 is 50,000
25% of 50,000 is 12,500
75% of 50,000 is 37,500
7.5% of 50,000 is 3,750
0.75% of 50,000 is 375

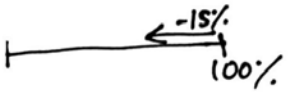
G7 U3 Lesson 15

Solve problems about real-world situations that involve percent increase and decrease.

G7 U3 Lesson 15 - Today we will solve multi-step percent problems.

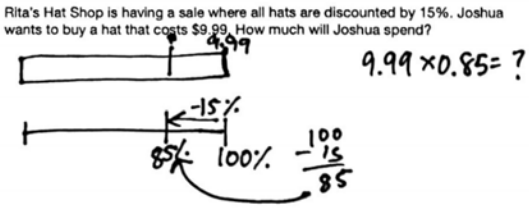
Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): Today we will solve multi-step percent problems. This is the last lesson of this unit so we are just seeing how we can take all the awesome work we've done to the next level.

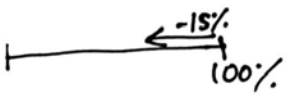


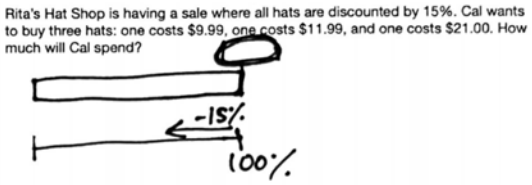
Let's Review (Slide 3): We already know use a diagram, table and equation to solve percent problems. Read the problem silently along with me while I read the problem out loud. *Read the problem out loud.* It says there's a 15% discount so I'll start by drawing a number line for 15% out of 100%.

It says, "Joshua wants to buy a hat that costs $9.99." So I will draw that. When I mark the question mark for the new price, I see I have to find the new percent. So I am going to subtract 100 - 15 which is 85%. Now I can set up a table or an equation. We would do 9.99 x 0.85 equals question mark. I am not going to do all that number-crunching right now. We just want to review the ideas we already know. Now let's think about how we will use these same ideas for multi-step problems.

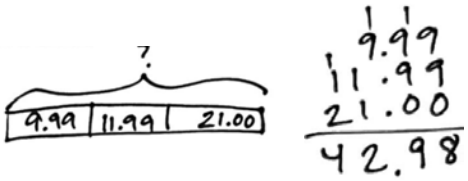


Let's Talk (Slide 4): For multi-step word problems, it is easier to calculate any sums before solving for the percent. Read the problem silently while I read the problem out loud. *Read the problem out loud.* We know to draw a picture. I will start with that first sentence and it is the same as the problem we just did on the last slide.

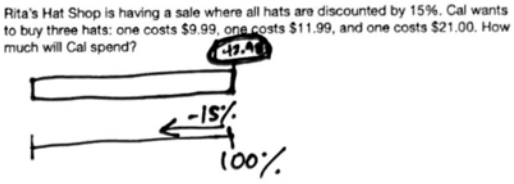




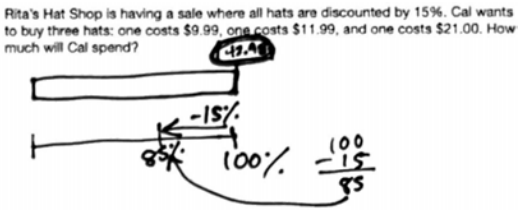
But now when I go to draw the rectangle, I realize that I am going to have a lot of math to do before I can fill that in.



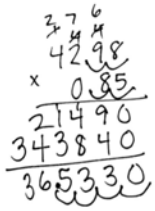
That's no problem. All this means is that I need to do some work off to the side of my paper. I might even need to draw a whole other tape diagram to figure that rectangle out and then I can go back. So let's see, Cal wants to buy 3 hats. So this rectangle is really 9.99 and 11.99 and 21.00. I am going to have to do that math first. I'm not going to spend must time talking that through since I know you know how to add. We get $42.98.



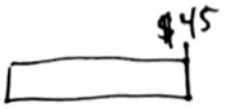
Now, I can go back to my percent work. $42.98 is that total amount.



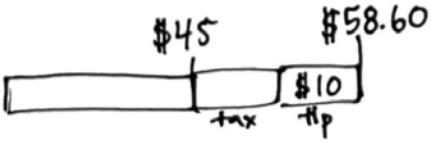
And now I do all the work I did before. 100 - 15 is 85%.



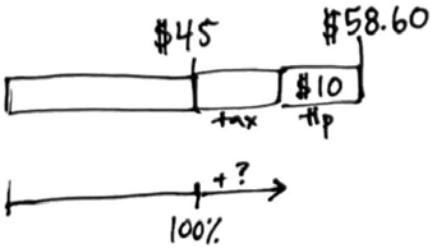
And I do 42.98 x 0.85. Let me show you that work. That is a lot! Imagine if I had found the percent for each separate hat. That would be a lot of number-crunching. So it makes sense to get the total bill and then find the final percent. So from now on, as we read, we might need to draw more than one tape diagram.



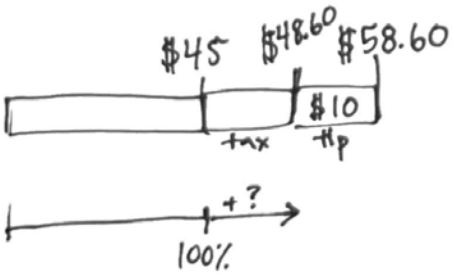
Let's Think (Slide 5): Let's do another one. This time we'll see that sometimes we will need to do a final step AFTER we find the percent. Read the problem silently while I read the problem out loud. *Read the problem out loud.* Let's draw! First, we represent the $45 dinner.



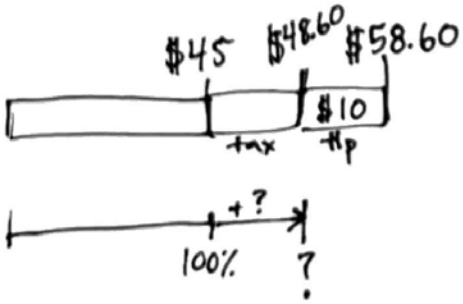
But it says, "she ended up paying $58.60 with the tax and tip." I am going to make a rectangle for tax and a rectangle for tip. All of that makes $58.60. Now it says the tip was $10.



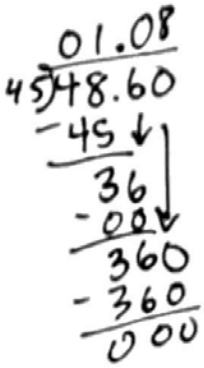
The question is asking for the tax percentage on the dinner. So now I will draw a percent line.



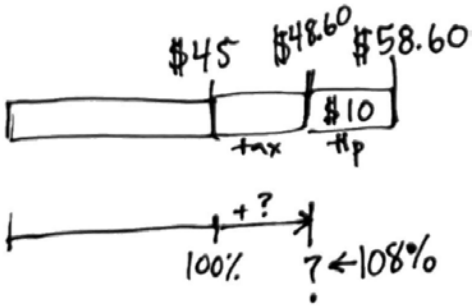
I can see in my picture that the first thing I need to do is get rid of the tip. That's $48.60.



But I still can't figure out this tax until I figure out the percent that corresponds to the $48.60. I'm going to put a question mark there too. Hopefully this is helping you see that we need to work in pieces.



So, let's just figure out that larger percent. 45 times question mark equals $48.60. Divide by 45 on each side. I will do the math over to the side. I get 1.08 which is 108%.



That's not my final answer though. I have to do 108% minus 100% to see that it's 8% tax.

Let's Try It (Slide 6): Now we will practice some more problems. I will lead you through step by step.

WARM WELCOME

Today we will solve multi-step percent problems.

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Let's Review:

We already know use a diagram, table and equation to solve percent problems.

Rita's Hat Shop is having a sale where all hats are discounted by 15%. Joshua wants to buy a hat that costs $9.99. How much will Joshua spend?

Let's Talk:

For multi-step word problems, it is easier to calculate any sums before solving for the percent.

Rita's Hat Shop is having a sale where all hats are discounted by 15%. Cal wants to buy three hats: one costs $9.99, one costs $11.99, and one costs $21.00. How much will Cal spend?

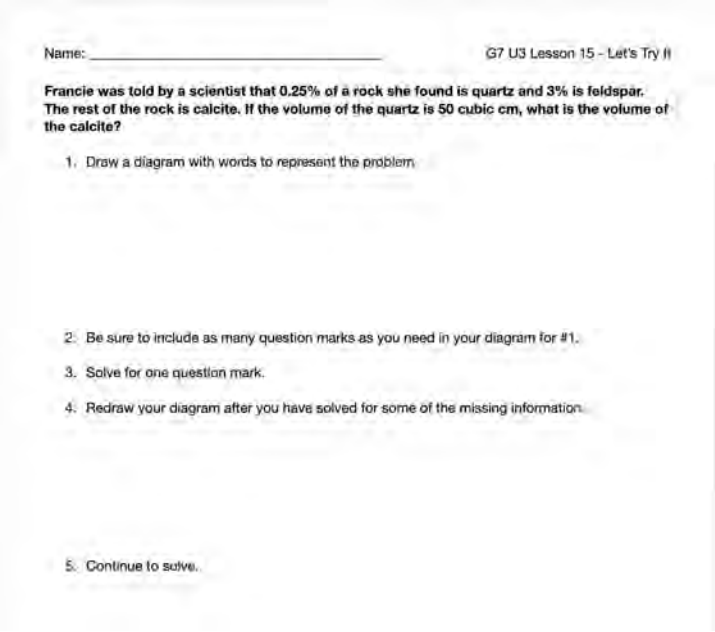
Let's Think:

Sometimes we will need to do a final step after we find the percent.

Jenna had a $45 dinner. But she ended up paying $58.60 with the tax and tip. If the tip was $10, what was tax percentage that Jenna was charged on the dinner?

Let's Try It:

We will do it together step by step!



Name: _____ G7 U3 Lesson 15 - Let's Try It

Francie was told by a scientist that 0.25% of a rock she found is quartz and 3% is feldspar. The rest of the rock is calcite. If the volume of the quartz is 50 cubic cm, what is the volume of the calcite?

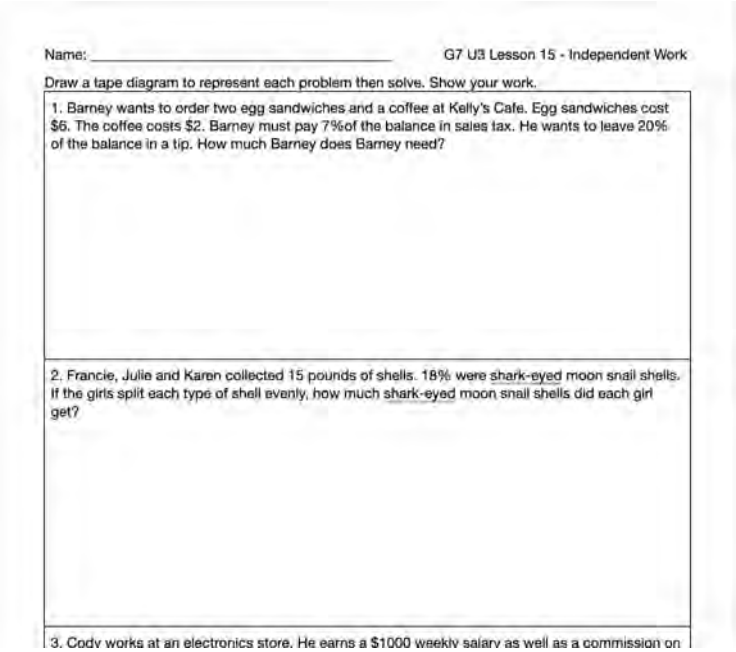
1. Draw a diagram with words to represent the problem.

2. Be sure to include as many question marks as you need in your diagram for #1.
3. Solve for one question mark.
4. Redraw your diagram after you have solved for some of the missing information.

5. Continue to solve.

On your Own:

Now it's time for you to do it on your own.



Name: _____ G7 U3 Lesson 15 - Independent Work

Draw a tape diagram to represent each problem then solve. Show your work.

1. Barney wants to order two egg sandwiches and a coffee at Kelly's Cafe. Egg sandwiches cost $6. The coffee costs $2. Barney must pay 7%of the balance in sales tax. He wants to leave 20% of the balance in a tip. How much Barney does Barney need?

2. Francie, Julie and Karen collected 15 pounds of shells. 18% were shark-eyed moon snail shells. If the girls split each type of shell evenly, how much shark-eyed moon snail shells did each girl get?

3. Cody works at an electronics store. He earns a $1000 weekly salary as well as a commission on

Francie was told by a scientist that 0.25% of a rock she found is quartz and 3% is feldspar. The rest of the rock is calcite. If the volume of the quartz is 50 cubic cm, what is the volume of the calcite?

1. Draw a diagram with words to represent the problem.

2. Be sure to include as many question marks as you need in your diagram for #1.

3. Solve for one question mark.

4. Redraw your diagram after you have solved for some of the missing information.

5. Continue to solve.

6. Write your final answer as a complete sentence.

Draw a tape diagram to represent each problem then solve. Show your work.

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2. Francie, Julie and Karen collected 15 pounds of shells. 18% were shark-eyed moon snail shells. If the girls split each type of shell evenly, how much shark-eyed moon snail shells did each girl get?

3. Cody works at an electronics store. He earns a $1000 weekly salary as well as a commission on whatever he sells. This week, Cody sold $45,000 in electronics. His paycheck was $5,500. What rate of commission must Cody receive on his sales?

Draw a tape diagram to represent each problem then solve. Show your work.

5. Bethany and her two brothers decided to split the cost of a Mother's Day gift for their mom. They decided to buy her a bought of flowers. The cost of the flowers was $150. There was 6% sales tax on the cost of the flowers as well as as $20 shipping fee. How much money did each person need to contribute for the gift?

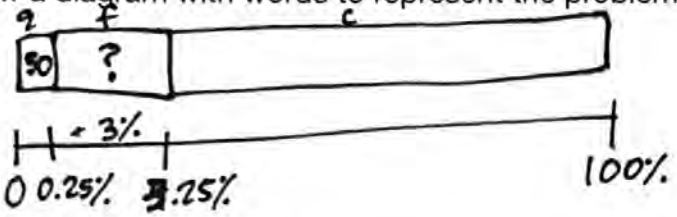
6. A $200 lawn mower was marked up by 10% at Home Depot. Keira has a 10% coupon. What was the final price of the lawn mower?

7. In Ms. Perlo's 6th grade class, 25% of students got a C on the final exam. 40% of students got a B on the final exam. 30% of students got an A on the final exam. The rest of the students got a perfect score. There are 40 kids in Ms. Perlo's class. How many kids got a perfect score?

Name: ANSWER KEY

Francie was told by a scientist that 0.25% of a rock she found is quartz and 3% is feldspar. The rest of the rock is calcite. If the volume of the quartz is 50 cubic cm, what is the volume of the calcite?

1. Draw a diagram with words to represent the problem.

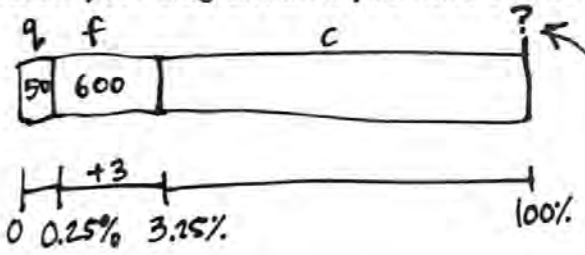


0.25% is 50
0.50% is 100
1.00% is 200
3% is 600

2. Be sure to include as many question marks as you need in your diagram for #1.

3. Solve for one question mark.

4. Redraw your diagram after you have solved for some of the missing information.



0.25% is 50
2.5% is 500
25% is 5,000
×4 ×4
100% is 20,000

5. Continue to solve.

$$\begin{array}{r} {}^{1}\cancel{2}{}^{9}0{,}000 \\ -\quad 600 \\ \hline 19{,}{}^{3}\cancel{4}{}^{1}00 \\ -\quad 50 \\ \hline 19{,}350 \end{array}$$

6. Write your final answer as a complete sentence.

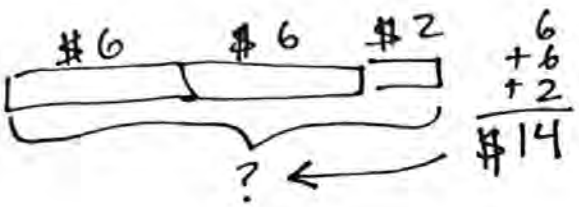
The volume of the calcite is 19,350 cubic cm.

Name: ANSWER KEY

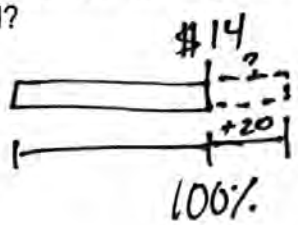
G7 U3 Lesson 15 - Independent Work

Draw a tape diagram to represent each problem then solve. Show your work.

1. Barney wants to order two egg sandwiches and a coffee at Kelly's Cafe. Egg sandwiches cost $6. The coffee costs $2. Barney must pay 7%of the balance in sales tax. He wants to leave 20% of the balance in a tip. How much ~~$~~ey does Barney need?



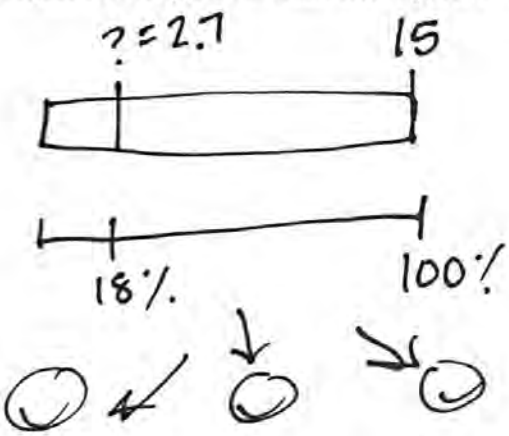
6
+6
+2
$14



14 × .2 = ?
2.8 = ?

$2.80 tip

2. Francie, Julie and Karen collected 15 pounds of shells. 18% were shark-eyed moon snail shells. If the girls split each type of shell evenly, how much shark-eyed moon snail shells did each girl get?



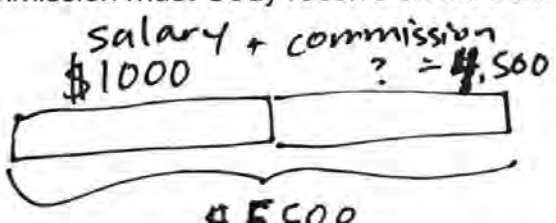
15 × .18 = ?

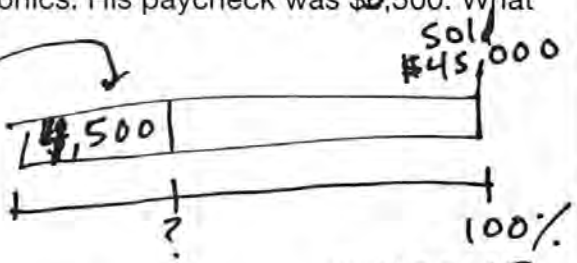
15
× 0.18
120
150
2.70

0.9
3) 2.7
-27
00

0.9 pounds

3. Cody works at an electronics store. He earns a $1000 weekly salary as well as a commission on whatever he sells. This week, Cody sold $45,000 in electronics. His paycheck was $5,500. What rate of commission must Cody receive on his sales?





5,500
-1,000
4,500

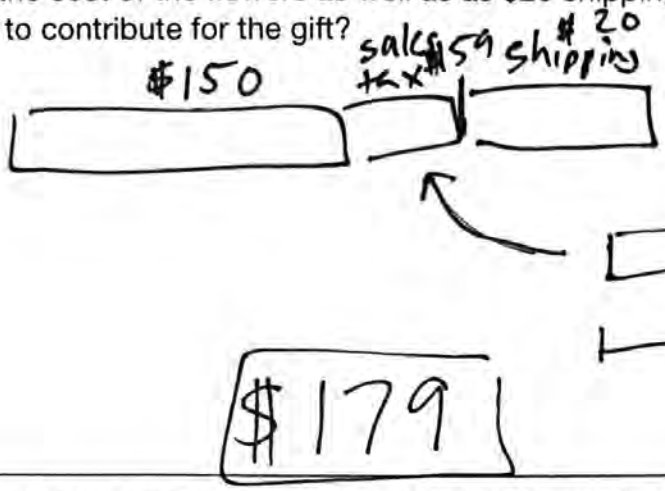
45,000 × ? = 4,500
45,000 45,000

0000.10
45000) 4500.00
45000
000,000

10%

Draw a tape diagram to represent each problem then solve. Show your work.

5. Bethany and her two brothers decided to split the cost of a Mother's Day gift for their mom. They decided to buy her a bought of flowers. The cost of the flowers was $150. There was 6% sales tax on the cost of the flowers as well as as $20 shipping fee. How much money did each person need to contribute for the gift?

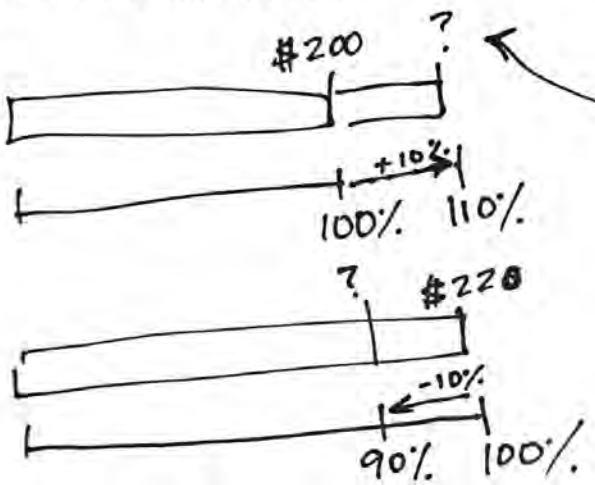


150 × 1.06 = ?

350
1.06
900
000
150
159.00

$179

6. A $200 lawn mower was marked up by 10% at Home Depot. Keira has a 10% coupon. What was the final price of the lawn mower?



200 × 1.1 = ?

220.0

220 × 0.9 = ?

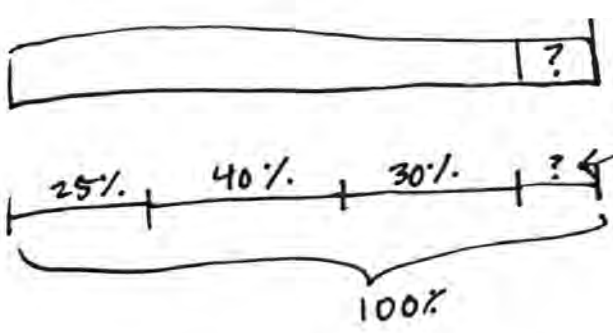
1
220
× 0.9
198.0

$198

7. In Ms. Perlo's 6th grade class, 25% of students got a C on the final exam. 40% of students got a B on the final exam. 30% of students got an A on the final exam. The rest of the students got a perfect score. There are 40 kids in Ms. Perlo's class. How many kids got a perfect score?

40

40 × 0.05 = ?



9
100
- 25
75
- 40
35
- 30
5%

40
× 0.05
2.00

2 kids