CITYTUTOR

Third 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;

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CITYTUTOR DC

G3 Unit 5:

Classifying Shapes

G3 U5 Lesson 1

Describe shapes

G3 U5 Lesson 1 - Students will describe the attributes of shapes.

Tutor Notes: Students begin developing their knowledge and understanding of shapes while they are in Kindergarten by learning to classify and describe two-dimensional (flat) and three-dimensional (solid) shapes. They learn vocabulary to use to describe shapes such as side, corner, square, cube, sphere, circle, triangle, and rectangle. As students further develop their understanding of shapes in first, second, third grade, they learn to classify shapes by their attributes. In K-2 this primarily means that they classify shapes by the number of sides that they have - triangles have three sides, hexagons have six sides, etc. While it is helpful for students to identify where they see these shapes in the real world, the concepts they must understand are how the attributes of the shape are how we classify and name the shape.

Warm Welcome (Slide 1): Tutor choice.

Frame the Learning/Connect to Prior Learning (Slide 2): Today we will be learning about shapes. You've probably been learning how to identify shapes since you were in pre-k, but we are going to dig deeper into our knowledge of shapes by considering their attributes or characteristics. We are going to be thinking about what makes one set of shapes different from another and how we can classify or organize the shapes. Today, we are going to make sure we all understand attributes like the number of sides and angles a shape has so that we can build on that learning with more complex ideas in our next lessons.

Let's Talk (Slide 3): Before we dive into our work today. I want to find out what you may already know about shapes. Let's take a look at a few shapes on this slide. **How might we describe these shapes to someone else?** Possible Student Answers, Key Points:

- The first one is called a triangle, it has three straight sides and three angles.
- The first one is flat or two-dimensional
- I also see a cube or a box.This is a cube.
- The cube is a solid or 3D shape, the cube has six faces that are squares.
- I see a trapezoid, another word for it is quadrilateral because it has 4 sides.
- The quadrilateral has 4 sides and 4 angles, it's flat which means it's two-dimensional.

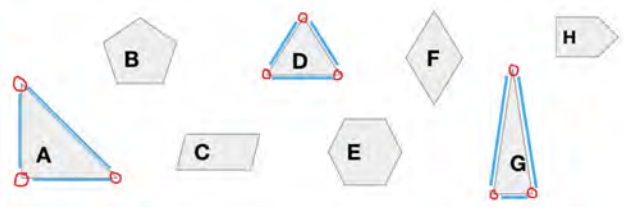
Note: Students likely will know the names of the triangle and the cube. If the students just provide the name of the shape, prompt them to describe something else they notice about the shape. Ask, "What if I didn't know what a cube was, what else might you tell me about the cube?"

Let's Talk (Slide 4) I love how you noticed and described different things about the shapes. You noticed that the shapes have straight sides and points! Those characteristics are called attributes. Today we are going to think about two important attributes of shapes, the number of sides the shape has and the number of angles a shape has.

- Today we'll be looking at 2-D shapes but it's important to notice that some shapes are two-dimensional or flat–like this triangle and this quadrilateral! And some shapes are solid, or three-dimensional, like this cube. Shapes that are 3D are shapes that you can pick up and look at from the top, bottom, or side. Today we're going to be working with attributes for 2D shapes. We can classify, or name 2D shapes based on how many sides and angles they have.
- Here's an example of a straight side (trace with finger). Do you see any other straight sides on the 2D shapes? Come trace them! (*Give students the opportunity to find other straight sides and trace them with their finger.*)
- This is an example of an angle (*point*). Do you see any other angles on the 2D shapes? Come point to them!

Very nice! You all told me that this shape is a triangle and we can describe it as having 3 straight sides and 3 angles. And this shape is a quadrilateral and it has 4 straight sides and 4 angles.

Let's Think (Slide 5): Let's see if we can use some of those ideas to help us identify and describe shapes. Let's look at the shapes on the slide. Which of these shapes have 3 sides and 3 angles? Shapes A, D, G!



That's right, shape A has 3 sides and 3 angles (*trace sides, circle angles*).

Shape D has 3 sides and 3 angles (*trace sides, circle angles*).

Finally, Shape G is a tall thin triangle with 3 sides and 3 angles.

Great job identifying the shapes with 3 sides and 3 angles. Any shape that has 3 sides and 3 angles is called a triangle.

Let's Think (Slide 6): Great job! Now, let's look at the shapes again. What other shapes might we be able to put in a group together based on their attributes? Why? Possible Student Answers, Key Points:

- Shapes C, F, and H all have 4 sides and 4 angles.
- Shapes B and I have 5 sides and 5 angles.
- Shapes E and J have 6 sides and 6 angles.

Note: If the student struggles to find shapes that can be grouped together, prompt the student to start by counting (and tracing if applicable) sides and see if they can find shapes that have the same number of sides. Then, prompt them to check how many angles the shape has as well (students can circle the angles they see to model the counting). Many students may not know the formal names "quadrilaterals", "pentagons", and "hexagons" yet. If they are successful in grouping shapes together by sides and angles, ask, "Do you know what shapes with 4 sides and 4 angles are called? 5 sides and 5 angles? 6 sides and 6 angles?" If they do not know yet, you will recap the names on the next slides.

Let's Think (Slide 7): Let's check to see how we did. We could have created four groups of shapes based on how many sides and angles they have. We could've grouped all of the shapes with 4 sides and 4 angles together, those are called quadrilaterals. We also coul've put B and I together because they both have 5 sides and 5 angles, those are called pentagons. And finally, we could've put E and J together because they both have 6 sides and 6 angles, those are called hexagons! You did a great job reasoning with the shapes to classify them into groups. Let's review the names of the groups we created before we move into our practice.

Let's Think (Slide 9): Here is a helpful reminder of the groups of shapes we just looked at based on the number of sides and the number of angles they have. Let's review the shapes we discussed today together before we practice. *Ask the student to restate the names of shapes and their key attributes discussed in today's lesson.*

Let's Try it (Slide 9): Now, we are going to work together to apply what we have learned about describing the attributes of shapes and naming shapes. Remember, we use attributes like the number of sides and angles to help us name the shapes correctly.

WARM WELCOME

Today we will describe the attributes of shapes.

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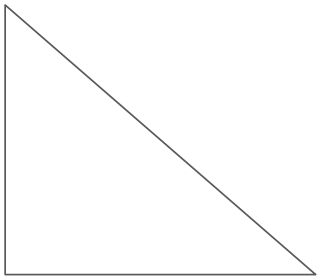
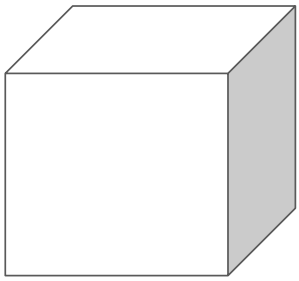
Let's Talk:

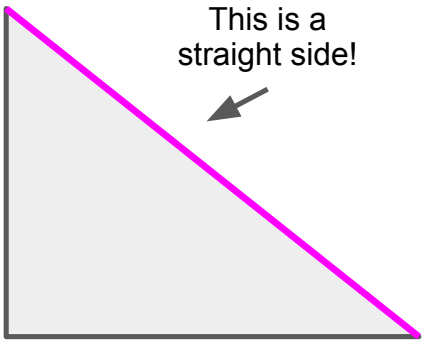
Let's look at these shapes. How might we describe these shapes to someone else?



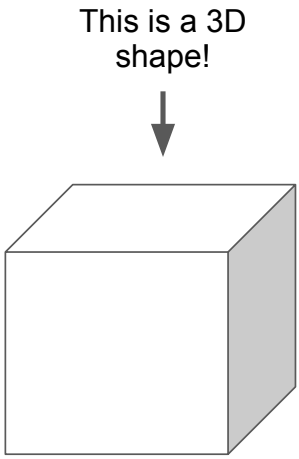


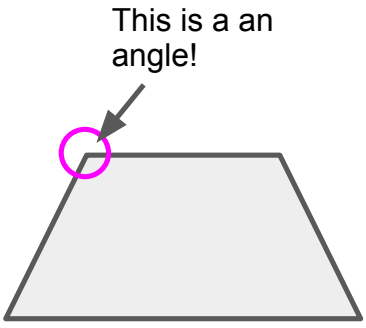
Let's Think:

We can describe shapes by their **sides**, their **angles**, or whether they are **flat** (2D) or **solid** (3D).



This is a flat, 2D, shape.

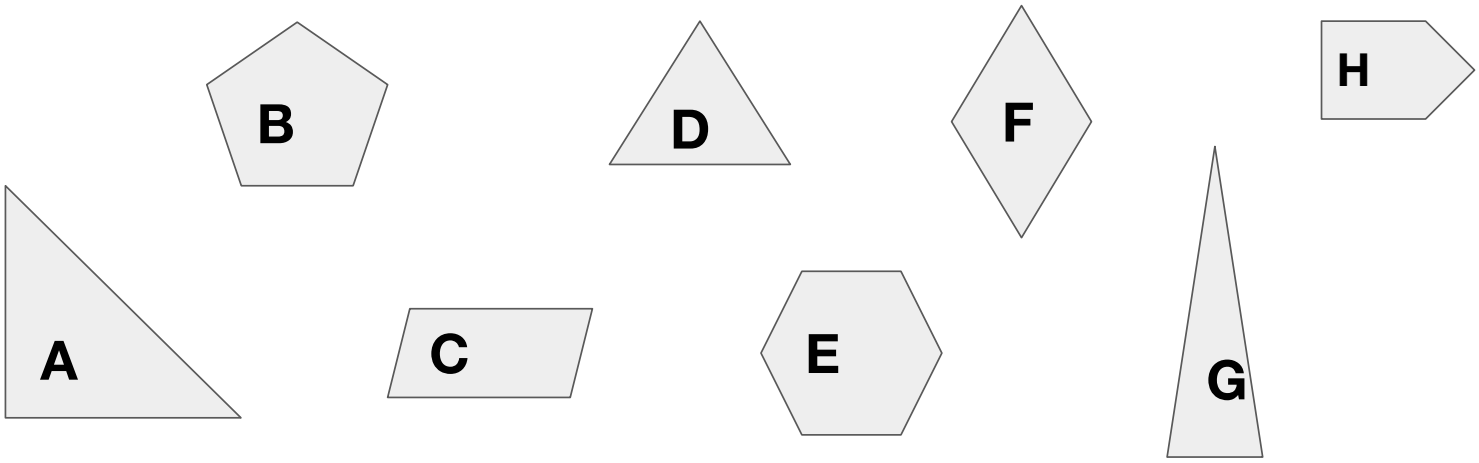




This is a flat, 2D, shape.

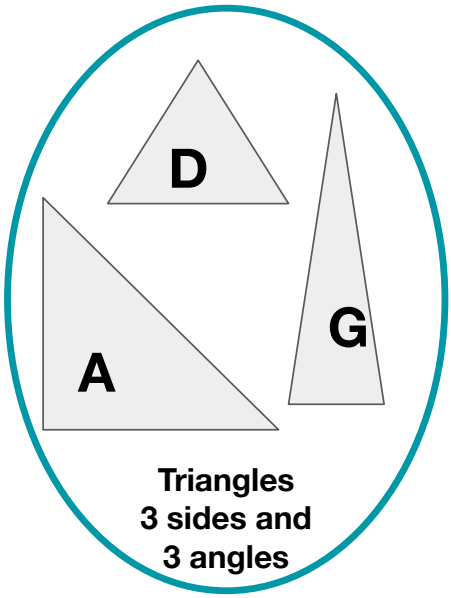
Let's Think:

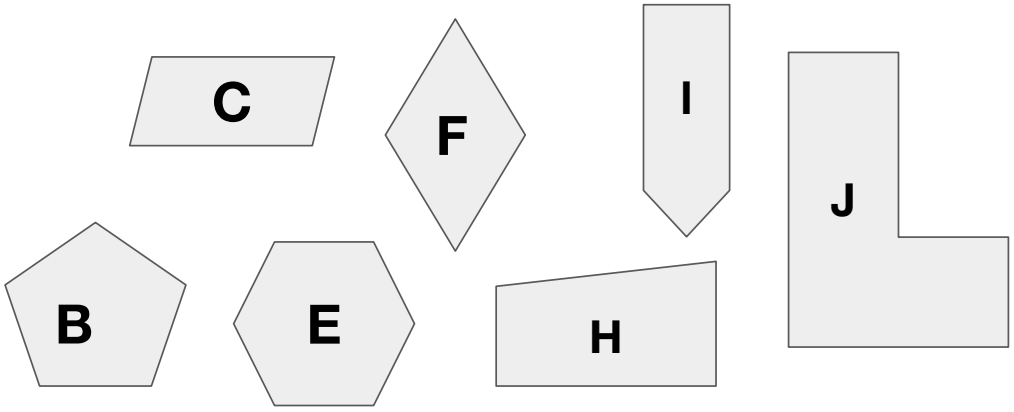
Which shapes have 3 sides and 3 angles? What can we call these shapes?



Let's Think:

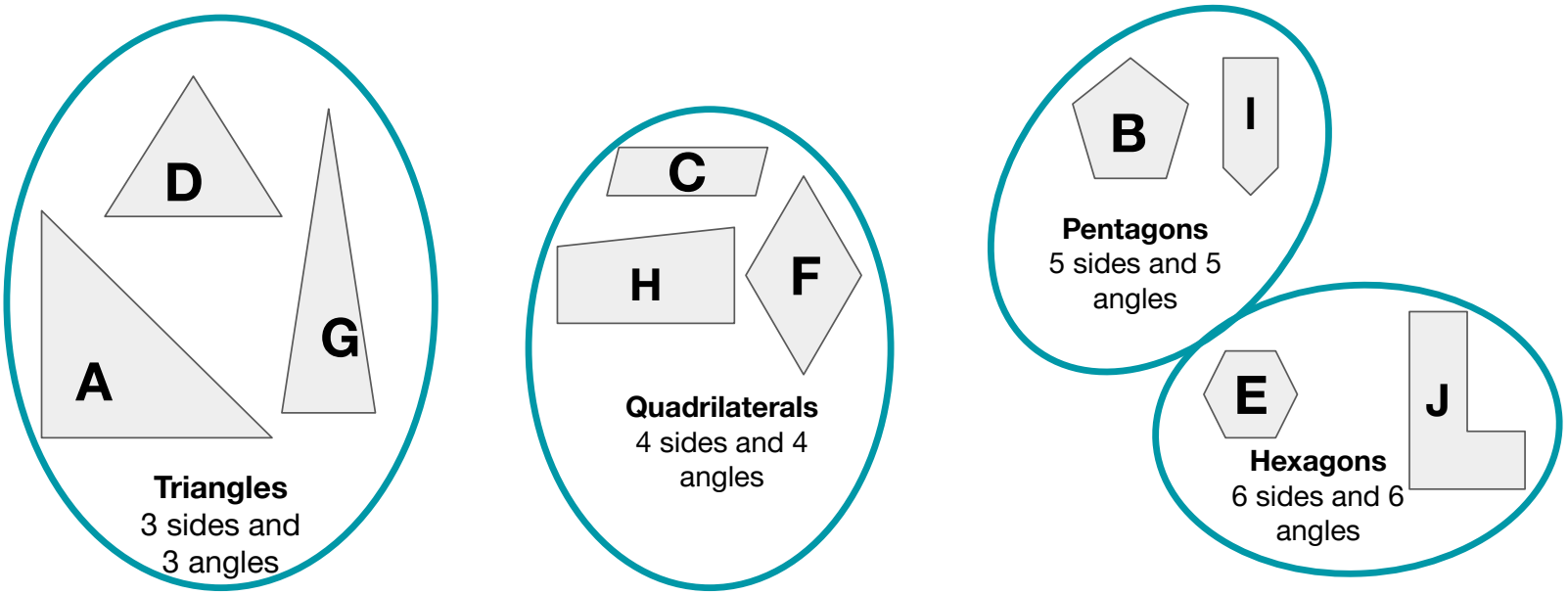
What other shapes might you put in a group together? Why?





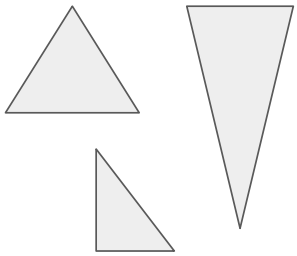
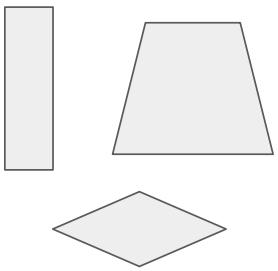
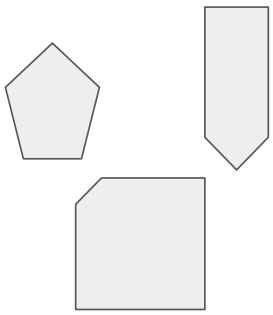
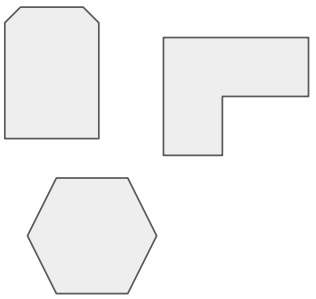
Let's Think:

What other shapes might you put in a group together? Why?



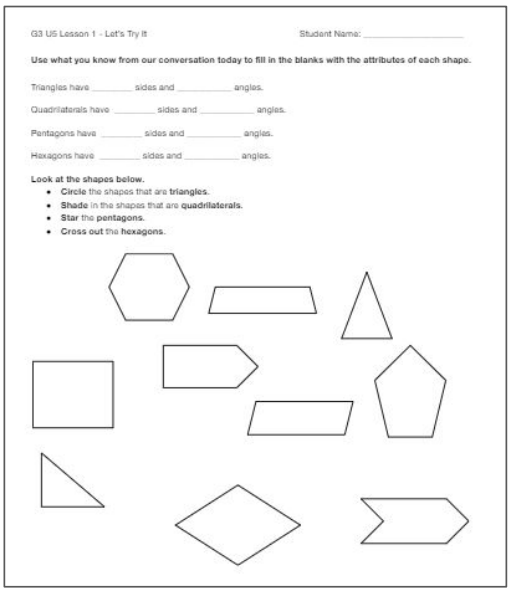
Let's Review:

We can name shapes based on how many sides and angles they have.

Triangles	Quadrilaterals	Pentagons	Hexagons
3 sides 3 angles	4 sides 4 angles	5 sides 5 angles	6 sides 6 angles
			

Let's Try It:

Let's explore recognizing attributes of shapes together.



G3 U5 Lesson 1 - Let's Try It Student Name: _____

Use what you know from our conversation today to fill in the blanks with the attributes of each shape.

Triangles have _____ sides and _____ angles.

Quadrilaterals have _____ sides and _____ angles.

Pentagons have _____ sides and _____ angles.

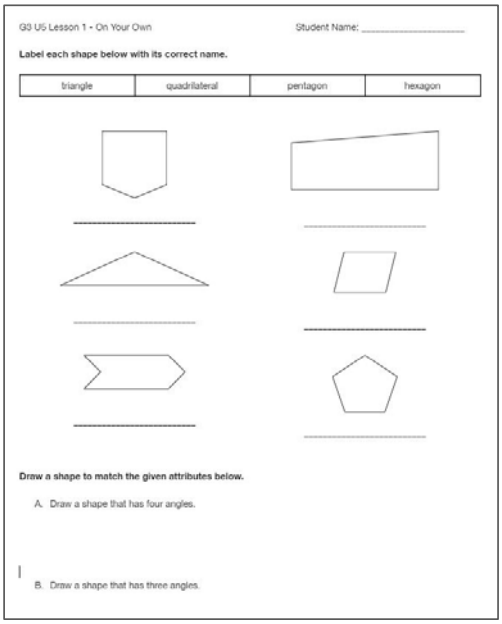
Hexagons have _____ sides and _____ angles.

Look at the shapes below.

- **Circle** the shapes that are **triangles.**
- **Shade** in the shapes that are **quadrilaterals.**
- **Star** the **pentagons.**
- **Cross out** the **hexagons.**

On your Own:

Now it's time to explore recognizing and creating shapes with specific attributes on your own.



G3 U5 Lesson 1 - On Your Own Student Name: _____

Label each shape below with its correct name.

triangle	quadrilateral	pentagon	hexagon

Draw a shape to match the given attributes below.

A. Draw a shape that has four angles.

B. Draw a shape that has three angles.

Name: _____ G3 U5 Lesson 1 - Let's Try It

Use what you know from our conversation today to fill in the blanks with the attributes of each shape.

Triangles have _____ sides and _____ angles.

Quadrilaterals have _____ sides and _____ angles.

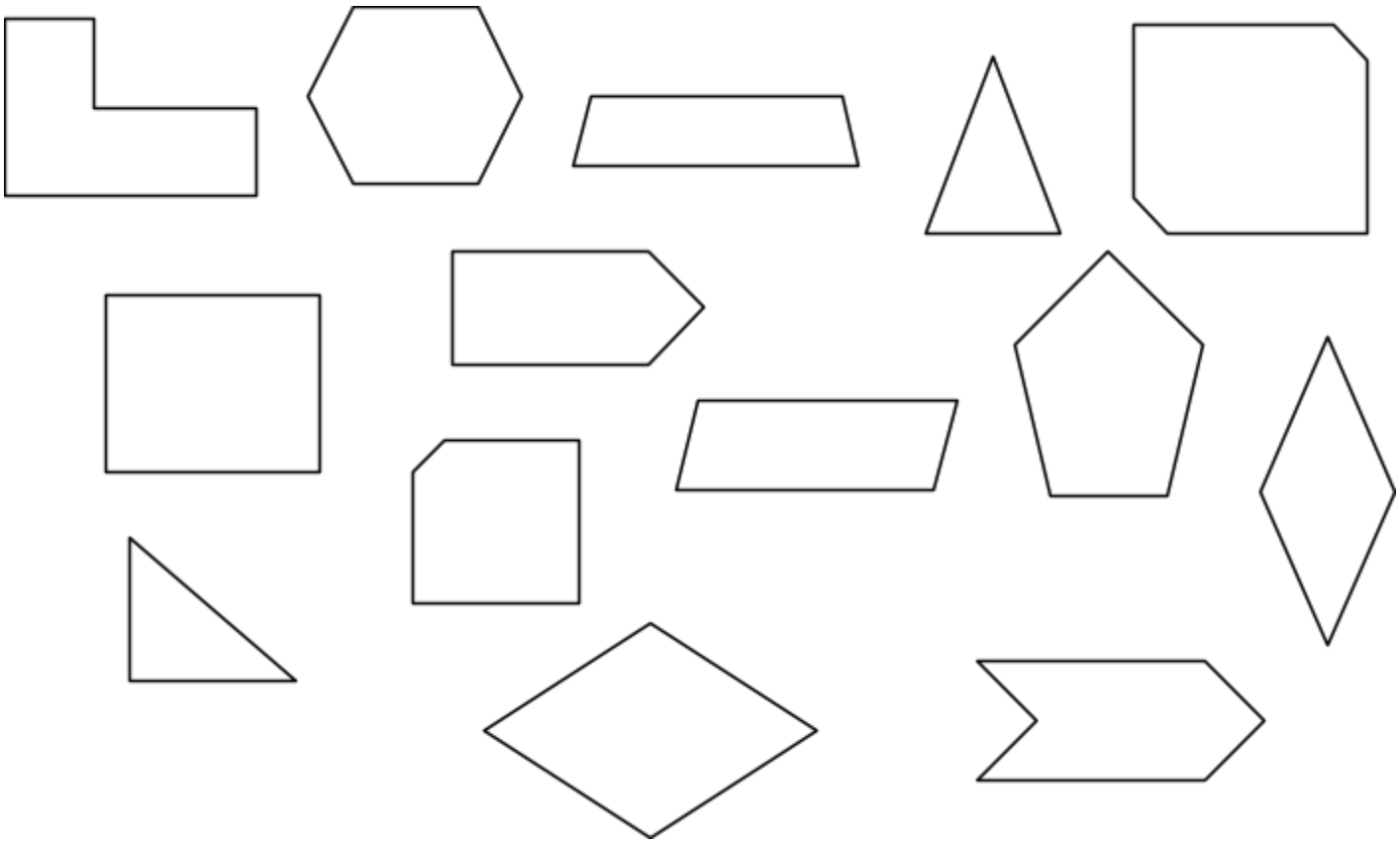
Pentagons have _____ sides and _____ angles.

Hexagons have _____ sides and _____ angles.

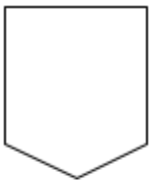
Look at the shapes below.

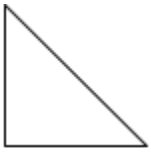
- **Circle** the shapes that are **triangles**.
- **Shade** in the shapes that are **quadrilaterals**.
- **Star** the **pentagons**.
- **Cross out** the **hexagons**.

Remember to trace sides and circle angles to show your counting and classifying.



Which of the following shapes is a quadrilateral?

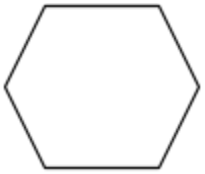
A 

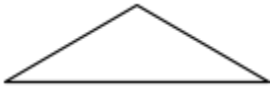
C 

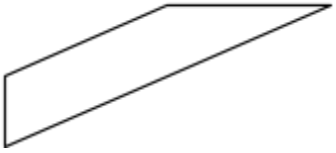
B 

D 

Which of the following shapes has 3 angles?

A 

C 

B 

D 

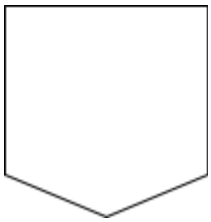
Draw a shape to match the given attributes below.

A. Draw a shape that has four sides and four angles.

B. Draw a shape that has three sides and three angles.

Label each shape below with its correct name.

triangle	quadrilateral	pentagon	hexagon



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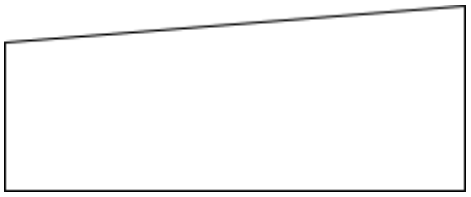

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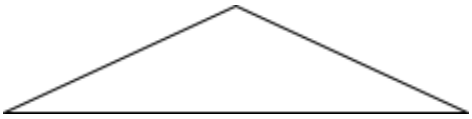

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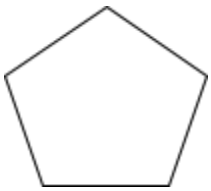


_____

Name: Answer Key

Use what you know from our conversation today to fill in the blanks with the attributes of each shape.

Triangles have 3 sides and 3 angles.

Quadrilaterals have 4 sides and 4 angles.

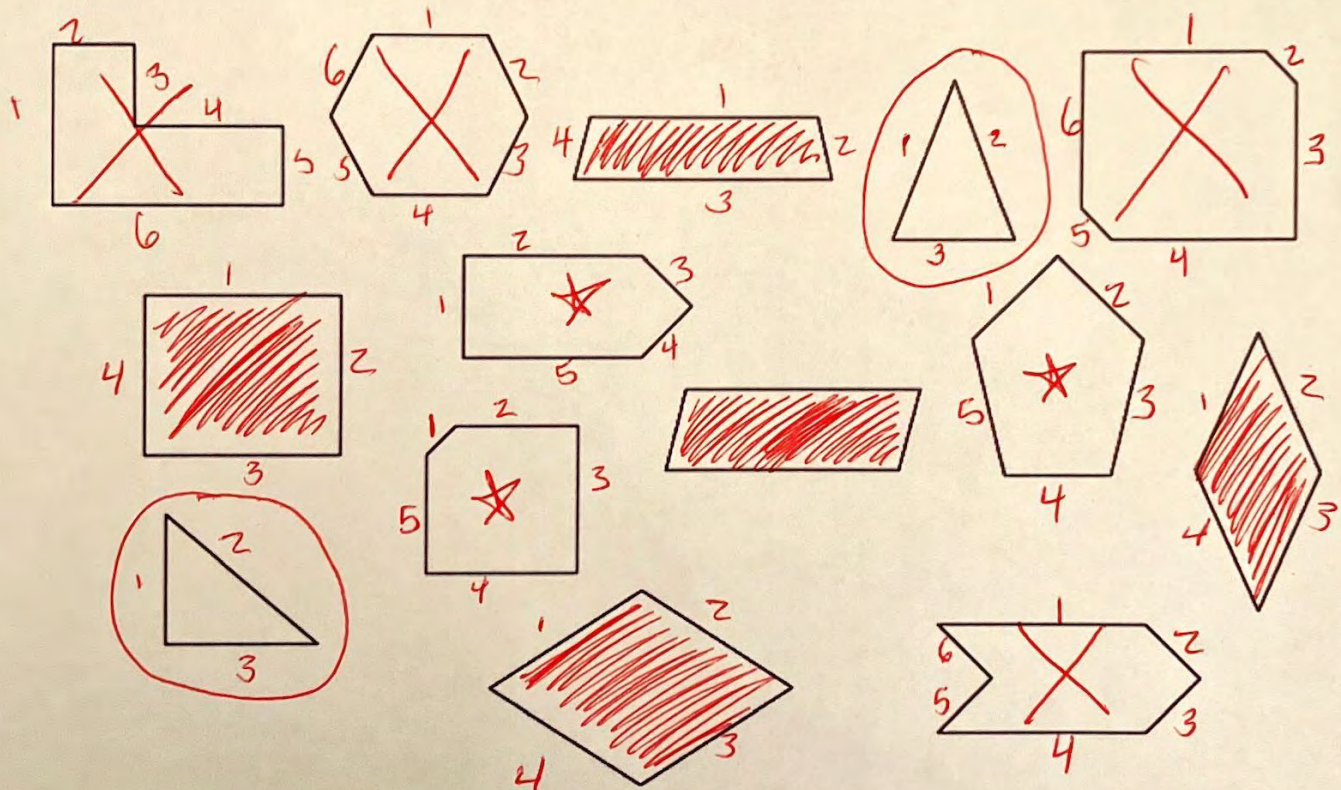
Pentagons have 5 sides and 5 angles.

Hexagons have 6 sides and 6 angles.

Look at the shapes below.

- **Circle** the shapes that are **triangles**.
- **Shade** in the shapes that are **quadrilaterals**.
- **Star** the **pentagons**.
- **Cross out** the **hexagons**.

Remember to trace sides and circle angles to show your counting and classifying.

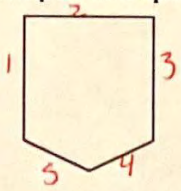


Student Name: Answer Key

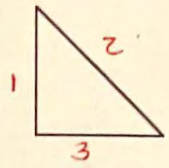
G3 U5 Lesson 1 - Independent Work

Which of the following shapes is a quadrilateral?

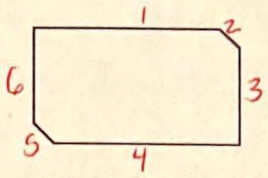
A



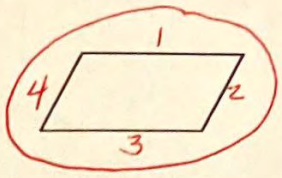
C



B

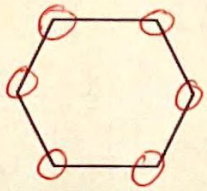


D

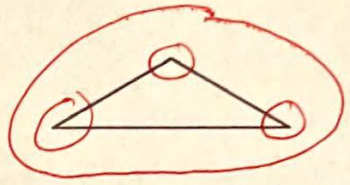


Which of the following shapes has 3 angles?

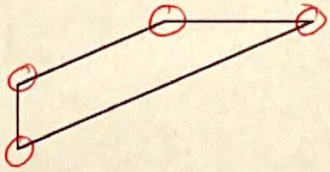
A



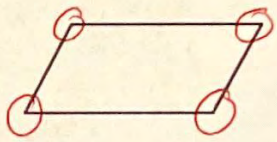
C



B

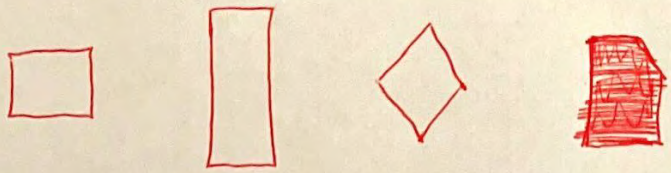


D



Draw a shape to match the given attributes below.

A. Draw a shape that has four sides and four angles. many correct answers



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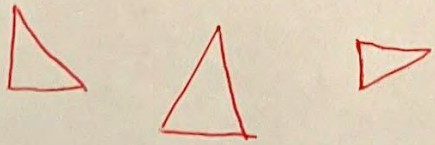
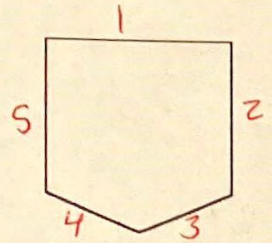
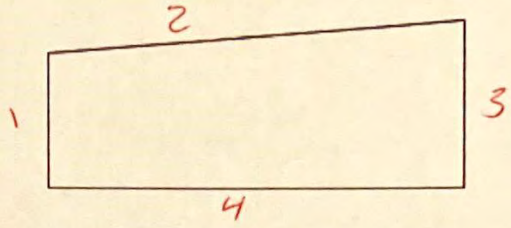


Label each shape below with its correct name.

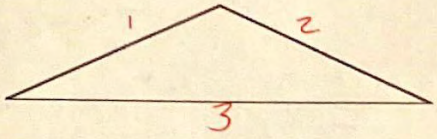
triangle	quadrilateral	pentagon	hexagon



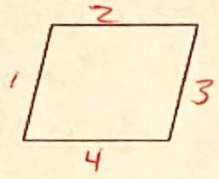
pentagon



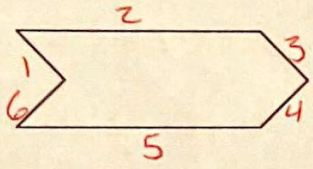
quadrilateral



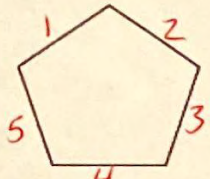
triangle



quadrilateral



hexagon



pentagon

G3 U5 Lesson 2

Describe quadrilaterals

G3 U5 Lesson 2- Students will describe attributes of quadrilaterals.

Tutor Notes: In today's lesson you will take students into a deeper understanding of the quadrilateral family. Quadrilaterals are any shape with 4 sides and 4 angles. We may think of the "regular" quadrilaterals like squares, rectangles, rhombuses, and trapezoids, but there are also "irregular" quadrilaterals that do not fit into a more specific subcategory. Quadrilaterals like squares and rectangles, have even more specific attributes that classify them as a subcategory within quadrilaterals, which will be covered in future lessons. However, it is imperative for students to understand that all shapes with 4 sides and 4 angles fall within the broad category of quadrilaterals. Today, if students correctly identify a shape as a rectangle or square, let them know that that's another name for quadrilaterals but today we're naming any shape with 4 sides/4 angles a quadrilateral.

Warm Welcome (Slide 1): Tutor choice.

Frame the Learning/Connect to Prior Learning (Slide 2): Last time we met we started discussing how we can describe or classify shapes based on their attributes. Remember that attributes are characteristics of the shape like the number of sides and number of angles the shape has. Today we are going to specifically focus on a family of shapes called quadrilaterals. Let's see if we can analyze some shapes to decide what some of the attributes of quadrilaterals are.

Let's Talk (Slide 3): Let's take a moment to look at the shapes. We can tell right away that the shapes are not all exactly the same, but they do have some attributes in common. **Take a moment to analyze the shapes and once you notice something that is the same about all of the shapes, give me a thumbs up.** Possible Student Answers, Key Points:

- They all have sides and angles.
- They all have four sides.
- They all have four angles.
- They all have corners
- They are all closed figures.

Nice work looking closely at these shapes! Even though the shapes do not look exactly the same, they all have four sides and they all have four angles (*trace sides, count angles as needed*), and any shape with four sides and four angles is called a quadrilateral. Say that with me…QUADRILATERAL!

Let's Think (Slide 4): So now we understand that quadrilaterals are shapes that have four sides and four angles. Some quadrilaterals are "regular" quadrilaterals that have names like square, rectangle, and trapezoid, and other shapes are "irregular" quadrilaterals that don't have another, more precise name. We will spend time in upcoming lessons discussing that more. For now, let's focus on calling ANY shape with four sides and four angles a quadrilateral. Let's work together to sort the shapes into two groups "Quadrilaterals" and "Non-quadrilaterals".

Let's begin by looking at Shape A. What should I do to figure out if Shape A is a quadrilateral or not? Count the sides and count the angles!

- Great! Let's check out Shape A. Count the sides and angles (*give students time*). Is it a quadrilateral? Yes!
- Now let's look at Shape B. Count the sides and angles (*give students time*). Is it a quadrilateral? Yes!
- Now let's look at Shape C. Count the sides and angles (*give students time*). Is it a quadrilateral? No! That's right, Shape C isn't even a polygon because it's not a close figure, all of its sides don't meet.
- You are doing great work so far, let's move to Shape D. Count the sides and angles (*give students time*). Is it a quadrilateral? Yes!

- Look at Shape D and count the sides and angles. Is it a quadrilateral? No, it's a triangle!
- Go ahead and count the sides and angles on Shape E. Is it a quadrilateral? No! Do you know the name of it? Pentagon!
- Now look at F and G and count the sides and angles. Are either quadrilaterals? Shape F is!

You did a great job reasoning with those shapes. Can you remind me, how were we sorting the shapes? How did you know which group the shapes belonged to? Possible Student Answers, Key Points:

- We were sorting the shapes into a group of quadrilaterals and non-quadrilaterals.
- I figured out which group the shapes belonged to by counting the sides and angles.
- The shapes with four sides and four angles were the quadrilaterals.

Let's Try it (Slides 5-6): Let's work together on some additional practice with describing, naming, and drawing quadrilaterals. Remember as we work through this together that quadrilaterals are shapes with four sides and four angles. When you are determining whether or not something is a quadrilateral, you can trace the slides to count or circle the angles.

WARM WELCOME

Today we will describe attributes of quadrilaterals.

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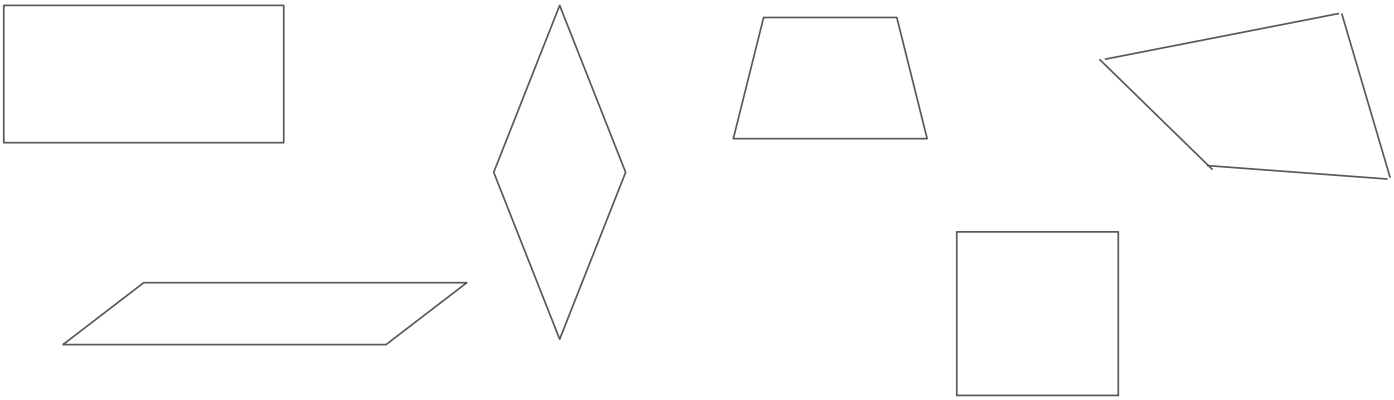
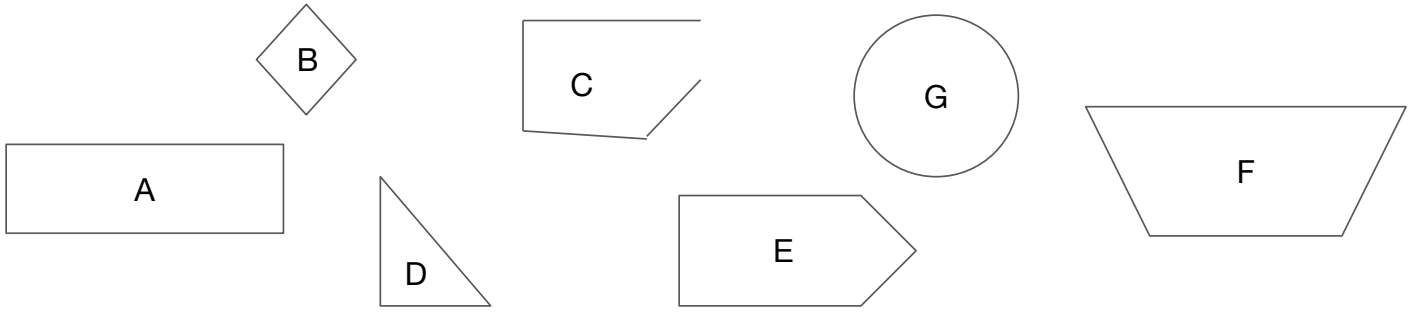
Let's Talk:

What do all of these shapes have in common?



Let's Think:

Quadrilaterals	Non-quadrilaterals



Let's Try It:

Let's apply our understanding together.

3 U5 Lesson 2 - Let's Try It Student Name: _____

Use some of the words from the bank below to fill in the blanks.

triangle	rectangle	attributes	quadrilaterals
rhombus	trapezoid	four	three

When we describe shapes, we describe them by their _____ like the number of sides or angles the shape has. Shapes are classified, or given specific names because of their attributes. For example, there is a family of shapes called _____ that has that name because they all have _____ sides and _____ angles. Some common examples of quadrilaterals are _____, _____, and _____.

Which of the following shapes is NOT a quadrilateral?

A 

C 

B 

D 

Roman is describing quadrilaterals to a friend. Which of the following could be what Roman said?

A. They are shapes with 5 sides and 5 angles.

B. They are shapes with round sides.

C. They are shapes with 4 sides and 4 angles.

D. They are shapes that are not closed.

On your Own:

Apply your understanding about quadrilaterals on your own.

3 U5 Lesson 2 - Own Your Own Student Name: _____

Natasha drew a group of non-quadrilaterals. Which of the following could have been a shape that Natasha drew?

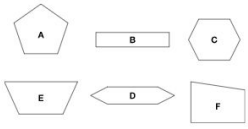
A 

B 

C

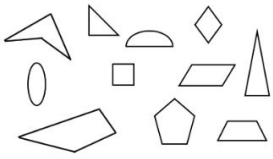
D 

William was building with some pattern blocks. Which of the blocks are examples of quadrilaterals?



A. Shape B only
B. Shapes B, C, and D
C. Shapes A, C, and D
D. Shapes B, E, and F

Samiyah was creating a puzzle for her little sister. She wanted to make sure all of the puzzle pieces were quadrilaterals. Which of the following shapes could Samiyah use in her puzzle design? Circle them.

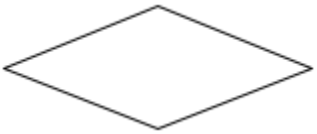


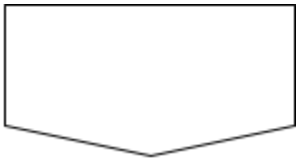
Use some of the words from the bank below to fill in the blanks.

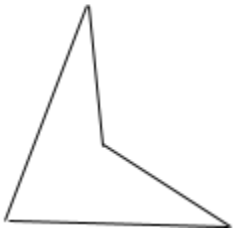
triangle	rectangle	attributes	quadrilaterals
rhombus	trapezoid	four	three

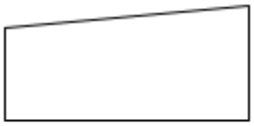
When we describe shapes, we describe them by their _____ like the number of sides or angles the shape has. Shapes are classified, or given specific names because of their attributes. For example, there is a family of shapes called _____ that has that name because they all have _____ sides and _____ angles. Some common examples of quadrilaterals are _____, _____, and _____.

Which of the following shapes is NOT a quadrilateral?

A 

C 

B 

D 

Roman is describing quadrilaterals to a friend. Which of the following could be what Roman said?

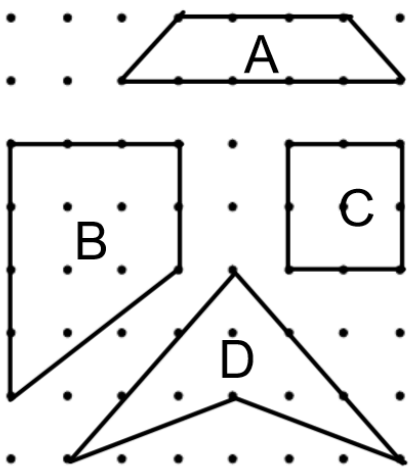
A. They are shapes with 5 sides and 5 angles.

B. They are shapes with round sides.

C. They are shapes with 4 sides and 4 angles.

D. They are shapes that are not closed.

Analyze the shapes below. What attributes do all of the shapes have in common?

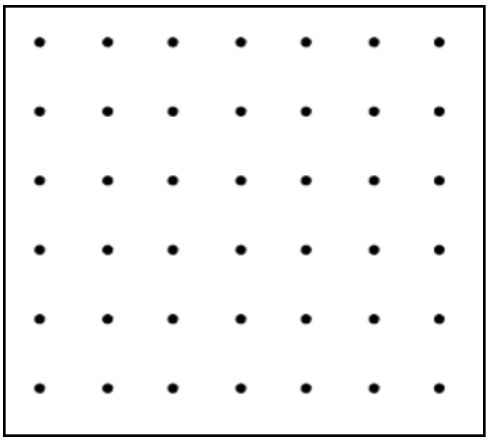


All of the shapes have _____ and

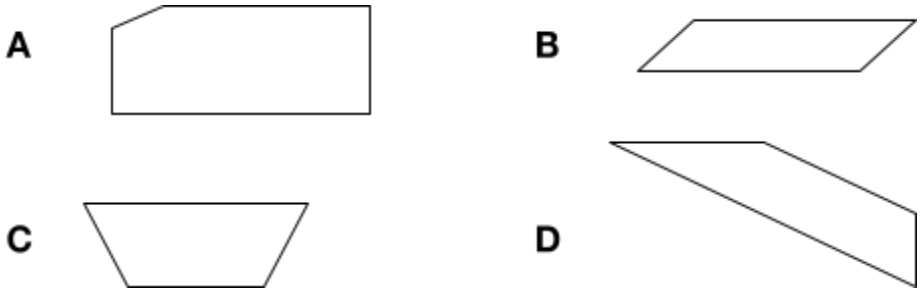
_____.

All of the shapes are _____.

Use the grid below to draw another quadrilateral that is different from Shapes A-D. Remember the attributes that must be true to make it a quadrilateral.



Natasha drew a group of non-quadrilaterals. Which of the following could have been a shape that Natasha drew?



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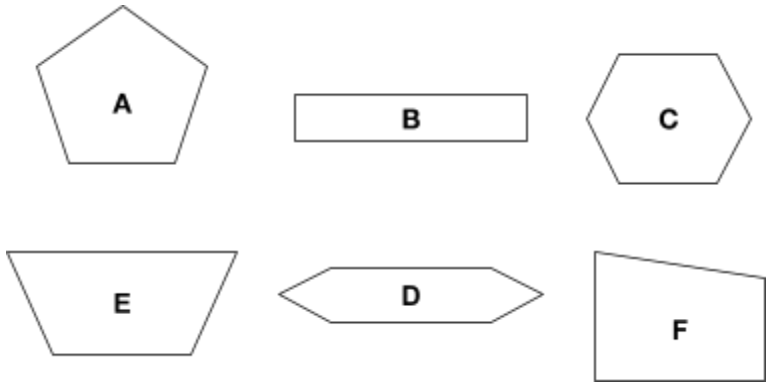

A. Shape B only
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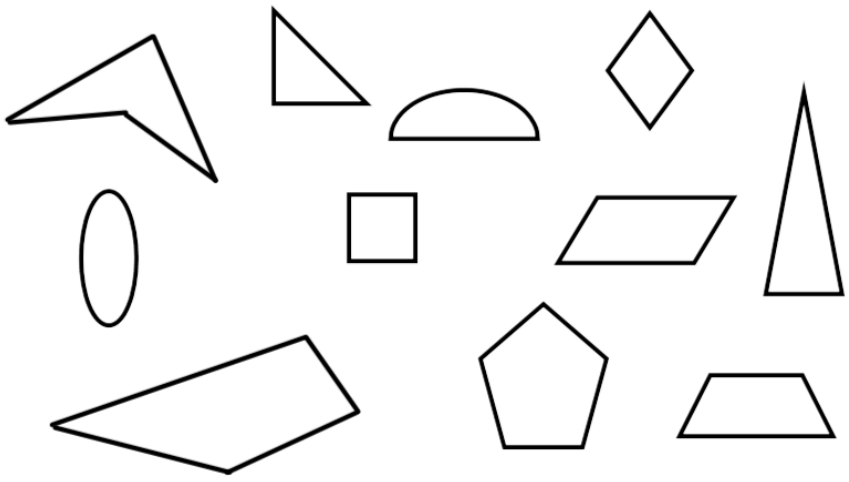
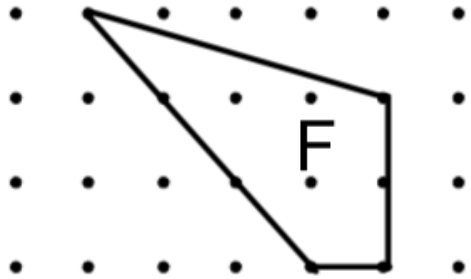


Ms. Lee's class was using geoboards and rubber bands to make shapes. Gael made the shape below and presented it to his group, saying it was a quadrilateral. Javion disagreed with Gael. He said, "That is not a quadrilateral because it's not a square, rectangle, rhombus, or trapezoid."



Do you agree with Gael or Javion? Why?

Student Name: Answer Key

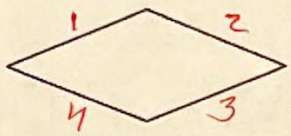
Use some of the words from the bank below to fill in the blanks.

triangle	rectangle	attributes	quadrilaterals
rhombus	trapezoid	four	three

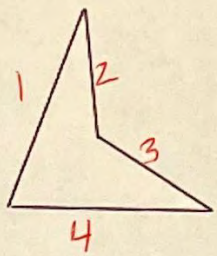
When we describe shapes, we describe them by their attributes like the number of sides or angles the shape has. Shapes are classified, or given specific names because of their attributes. For example, there is a family of shapes called quadrilaterals that has that name because they all have Four sides and Four angles. Some common examples of quadrilaterals are rhombus, trapezoid, and rectangle.

Which of the following shapes is NOT a quadrilateral?

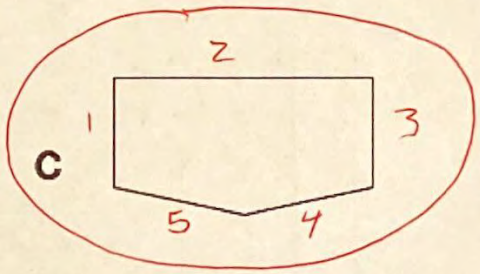
A



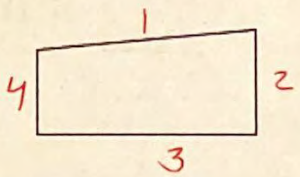
B



C



D



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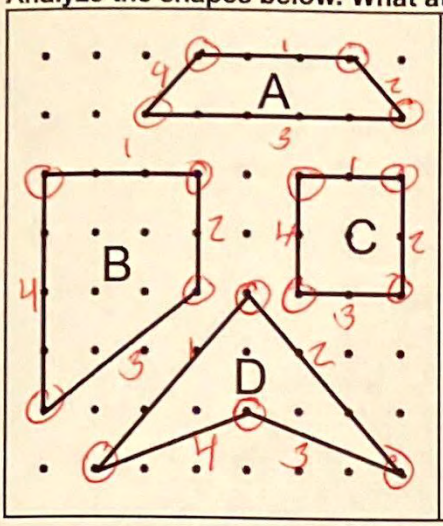

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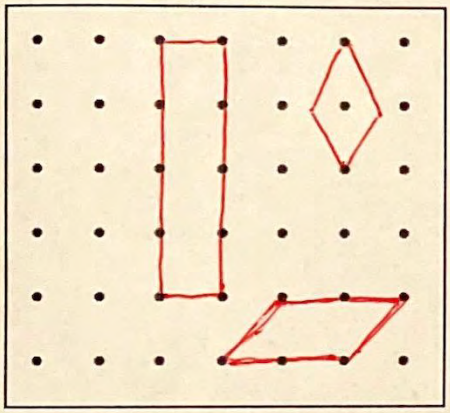

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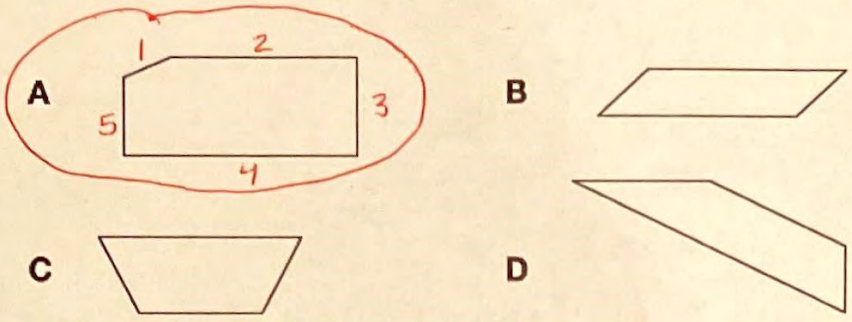

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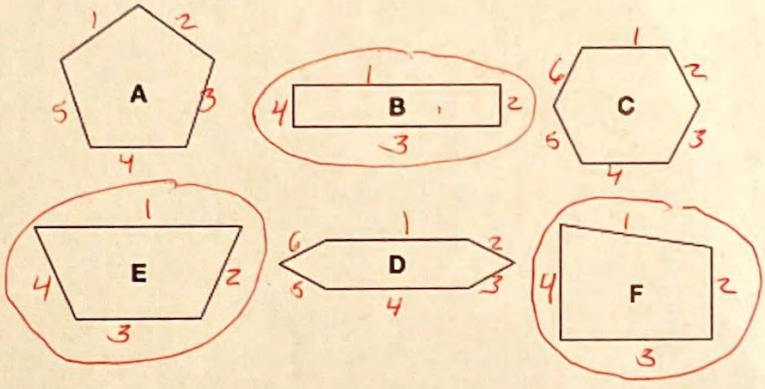

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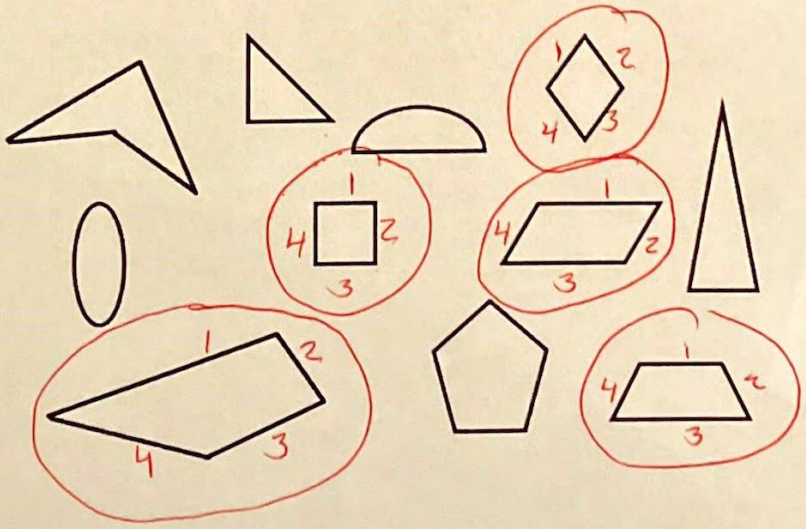

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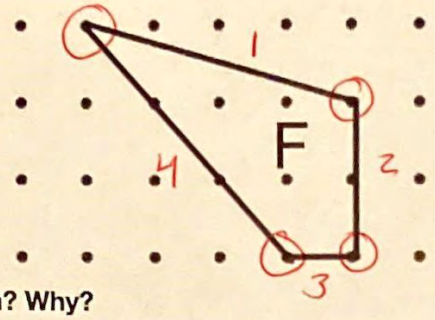


Do you agree with Gael or Javion? Why?

I agree with Gael. This shape is a quadrilateral because it has 4 sides and 4 angles.

G3 U5 Lesson 3

Describe parallelograms and trapezoids

G3 U5 Lesson 3 - Students will describe the attributes of parallelograms and trapezoids.

Tutor Notes: Over the next few lessons, you will be covering the family of quadrilaterals more in depth. A lot of the vocabulary you will be using to describe new attributes will be brand new or unfamiliar to students. Remember to encourage students to use precise terminology as much as possible when describing shapes. In today's lesson you will be taking an in-depth look at parallelograms and trapezoids. These shapes belong in different subcategories of quadrilaterals because parallelograms have two pairs of sides that are parallel to each other, while trapezoids only have one set of parallel sides.

Materials:

- Dot paper

Warm Welcome (Slide 1): Tutor choice.

Frame the Learning/Connect to Prior Learning (Slide 2): The last time we met, we discussed a family of shapes called quadrilaterals. We looked at a lot of examples of quadrilaterals like squares and rectangles, but we also looked at shapes that are simply called quadrilaterals because they have four sides and four angles. Today we are going to investigate two specific types of quadrilaterals, called trapezoids and parallelograms. We are going to learn about the attributes that they have in common but also the attributes that make them different from each other.

Let's Talk (Slide 3): Before we start investigating parallelograms and trapezoids, we are going to investigate the idea of parallel lines. Let's look at the two images of blue and green cars driving on the road. Imagine if the cars continue to drive forward along the road. **Will the cars crash into each other? In which picture? How do you know?** Possible Student Answers, Key Points:

- In Example A, the cars are going to crash. I know because if the blue car keeps driving on that road, the road is going to run into where the green car is driving.
- In Example B, the cars will not crash into each other while they are driving. The roads will not cross each other, so the cars will not crash.

You are absolutely right. The cars in Example B will never crash into each other, even if they keep driving on those roads forever. That is because the roads are parallel to each other. They can extend on and on forever, but they are never going to cross each other.

Let's Talk (Slide 4): So as we just saw in our examples about the cars driving on the roads, parallel lines are lines that will never, ever, ever intersect even though they continue on forever. Let's look at some examples on the screen.

Notice Set A. The lines in set A intersect or touch. That means that they are not parallel lines. Now let's look at Set B. **What are you noticing about Set B?** Possible Student Answers, Key Points:

- Set B is not parallel. If you stretch out the lines further, they will intersect or touch.
- They aren't touching in the picture but if they keep going they'll touch eventually.
- *Note: If the students struggle to recognize that the lines are not parallel because they are not actually touching in the image, remind students that lines stretch on forever, so if we imagine stretching out the lines, we can see that they will intersect or run into each other.*

Great job, you're right that Set B isn't parallel because eventually, if we extend those lines they will cross or intersect. Now, let's take a look at Set C. Imagine stretching out the lines in Set C, like it's a road that two cars are driving on. **What do you think?** Possible Student Answers, Key Points:

- The lines in set C are parallel because even when we stretch them out, they will not intersect.
- If those lines keep going forever, they'll never cross.

You are absolutely right, those lines are never going to touch, even when we extend them. **What do you notice about the lines in Set D?** Possible Student Answers, Key Points:

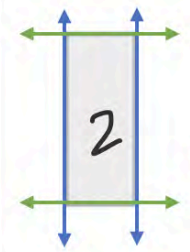
- The lines in set D are parallel too because even when we stretch them out, they will not intersect.

Two more to go. Let's look at the lines in Set E. Remember to stretch the lines out to test whether or not they are parallel. **So, are the lines in Set E parallel, yes or no**? No! Why? Because they'll never intersect! Great work. Last one. **Talk to me about the lines in Set F.** Possible Student Answers, Key Points:

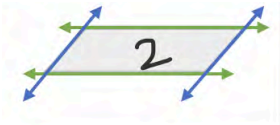
- The lines in set F are examples of parallel lines because they will never, ever intersect even when they stretch out forever.

Awesome job working to identify those sets of lines as parallel or not parallel. We can use the same strategy of stretching out or extending sides in shapes to check to see if the sides of the shape are parallel to each other or not. And if we're struggling, we can always imagine that the blue car and green car are driving on our lines and decide whether they'll crash into each other or not. Remember to test your cars in BOTH directions to check!

Let's Talk (Slide 5): Let's look at the sets of shapes on the screen. Even though trapezoids and parallelograms are in different families, they do share some attributes. **What can we say is the same about all of the parallelograms and trapezoids?** They all have four sides and four angles. They are all quadrilaterals! That's right, parallelograms and trapezoids are both types of quadrilaterals because they both have 4 sides and 4 angles. **But, what's different about them?** Hmm, let's explore that together by looking closely at which shapes have sets of parallel lines and how many.

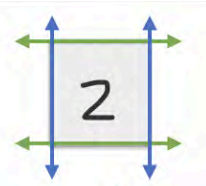


We know that parallel lines will never, ever intersect, like we talked about with the blue and green cars! So let's use that understanding to check to see if any of the sides of the rectangle are parallel to each other. I'm going to trace the lines and extend the sides of the rectangle out to show that even when stretched on, the lines will never intersect. So I'm seeing that a rectangle actually has two pairs of parallel sides - the sides are parallel and the top and bottom are parallel–let me label how many SETS of parallel lines this shape has. I wonder if that's true for the other shapes on the parallelogram side.



Now let's look at this shape! Let's use our colors to check if the rhombus has parallel lines! There are two pairs of parallel sides in the rhombus, too. Let's label that!

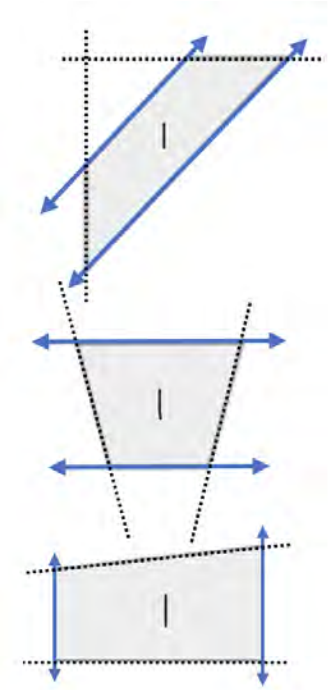
Now let's take a look at this quadrilateral.How many sets of parallel lines does this shape have? 2! Let's go ahead and label, are you starting to see a pattern with all of the parallelograms?



Finally, let's check the square! How many sets of parallel lines do we see here? Two!

Oh, interesting! So all of the shapes that are parallelograms have 4 angles, 4 sides, AND two sets of parallel lines. Let's investigate the trapezoids and see if that is the same or different.

What should I do to check for pairs of parallel sides? Stretch out the sides. Use your pencil to extend the sides to see if they will touch.



Let's start with this shape. I see that the top and bottom are parallel but the sides aren't parallel, look if we extend them they'll cross. So this shape as ONE set of parallel lines, let's label that.

Now let's look at this shape, I see the top and bottom are parallel but the sides aren't quite parallel, look if cars travel down these two roads, eventually they'll crash into each other. So this shape also only has ONE set of parallel lines, let's label that too.

Last one! This one, the sides are parallel to each other but the top and bottom aren't quite parallel, if cars keep going on these roads, eventually they'll crash!

So, all of the shapes that are labeled trapezoid have 4 sides, 4 angles, and ONE set of parallel lines.

Let's Think (Slide 7): So, today we found out that parallelograms and trapezoids are both in the quadrilateral family, but they aren't exactly the same. It's sort of like how you and your cousins are in the same family, but you don't have the same parents and you're not exactly the same. You might look alike, maybe you have the same eye or hair color, but you also have differences, just like the parallelograms and trapezoids.

Let's Try it (Slide 8): Today we worked together to identify the main difference in the attributes of parallelograms versus trapezoids. Parallelograms have two pairs of parallel sides and the trapezoid family only has one pair of parallel sides. Remember while we practice, we can extend or stretch out the sides of the shapes with a pencil or a marker to check to see if they will intersect, and we can think about those blue and green cars driving along the sides of the shapes to see if they will crash. Let's practice our understanding of the similarities and differences between parallelograms and trapezoids together.

WARM WELCOME

Today we will describe the attributes of parallelograms and trapezoids.

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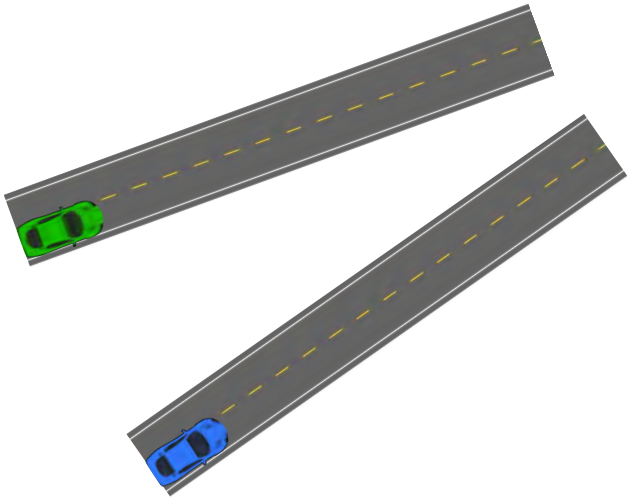
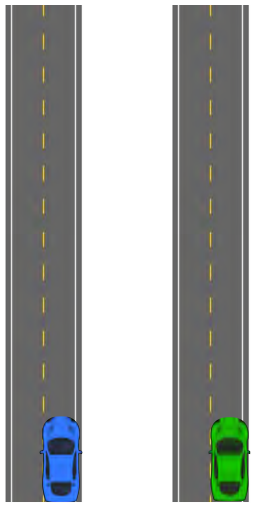
Let's Talk:

Imagine the green car and blue car are traveling together on the roads. If they continue driving, would they crash why or why not?

Example A

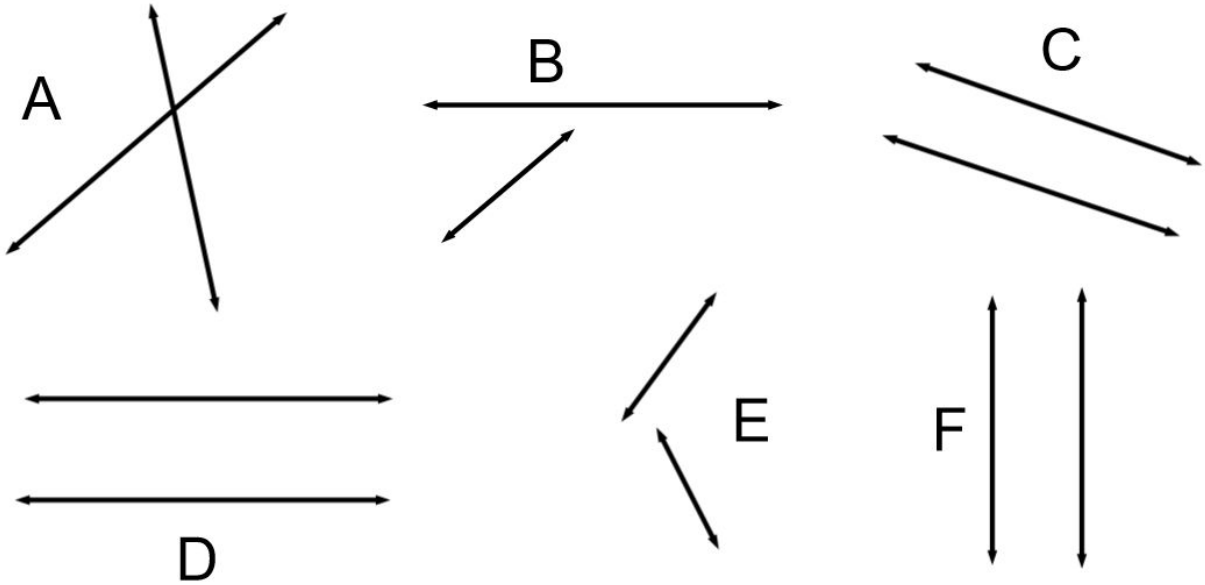


Example B



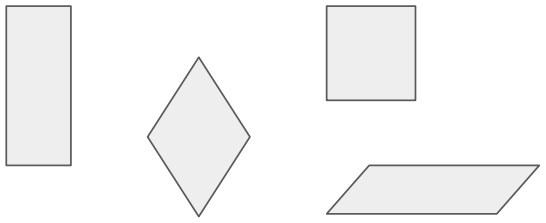
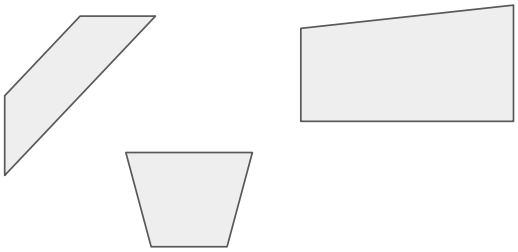
Let's Talk:

Parallel or not parallel?

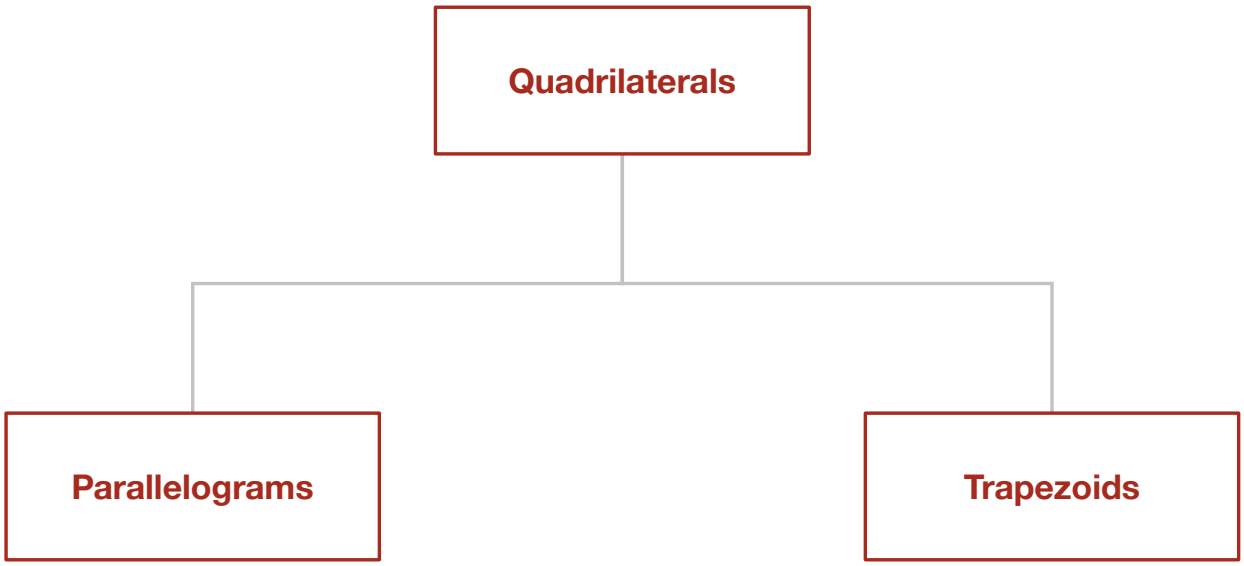


Let's Think:

What is the **same** about both parallelograms and trapezoids? What is **different**?

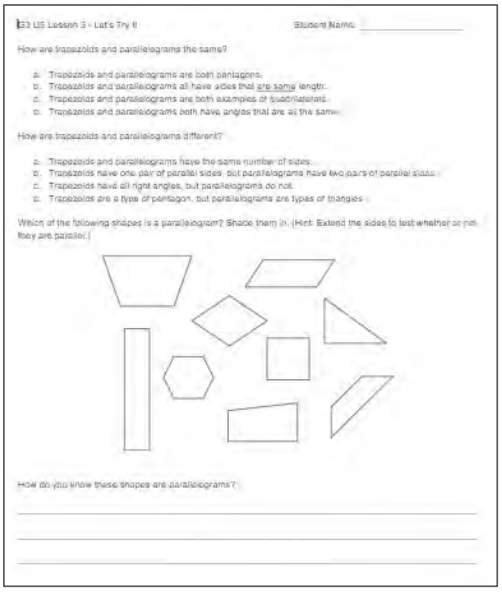
Parallelograms	Trapezoids
	

Let's Think:



Let's Try It:

Let's apply our understanding together.



G3 US Lesson 3 - Let's Try It

Student Name: _____

How are trapezoids and parallelograms the same?

a. Trapezoids and parallelograms are both pentagons.
b. Trapezoids and parallelograms all have sides that are same length.
c. Trapezoids and parallelograms are both examples of quadrilaterals.
d. Trapezoids and parallelograms both have angles that are all the same.

How are trapezoids and parallelograms different?

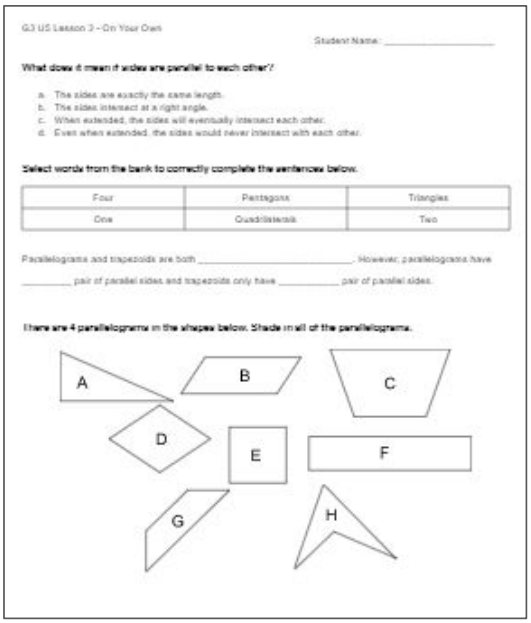
a. Trapezoids and parallelograms have the same number of sides.
b. Trapezoids have one pair of parallel sides. But parallelograms have two pairs of parallel sides.
c. Trapezoids have all right angles, but parallelograms do not.
d. Trapezoids are a type of pentagon, but parallelograms are types of triangles.

Which of the following shapes is a parallelogram? Shade them in. (Hint: Extend the sides to test whether or not they are parallel.)

How do you know these shapes are parallelograms?

On your Own:

Let's try on our own.



G3 US Lesson 3 - On Your Own

Student Name: _____

What does it mean if sides are parallel to each other?

a. The sides are exactly the same length.
b. The sides intersect at a right angle.
c. When extended, the sides will eventually intersect each other.
d. Even when extended, the sides would never intersect with each other.

Select words from the bank to correctly complete the sentences below.

Four	Pentagons	Triangles
One	Quadrilaterals	Two

Parallelograms and trapezoids are both _____. However, parallelograms have _____ pair of parallel sides and trapezoids only have _____ pair of parallel sides.

There are 4 parallelograms in the shapes below. Shade in all of the parallelograms.

A B C D E F G H

How are trapezoids and parallelograms the same?

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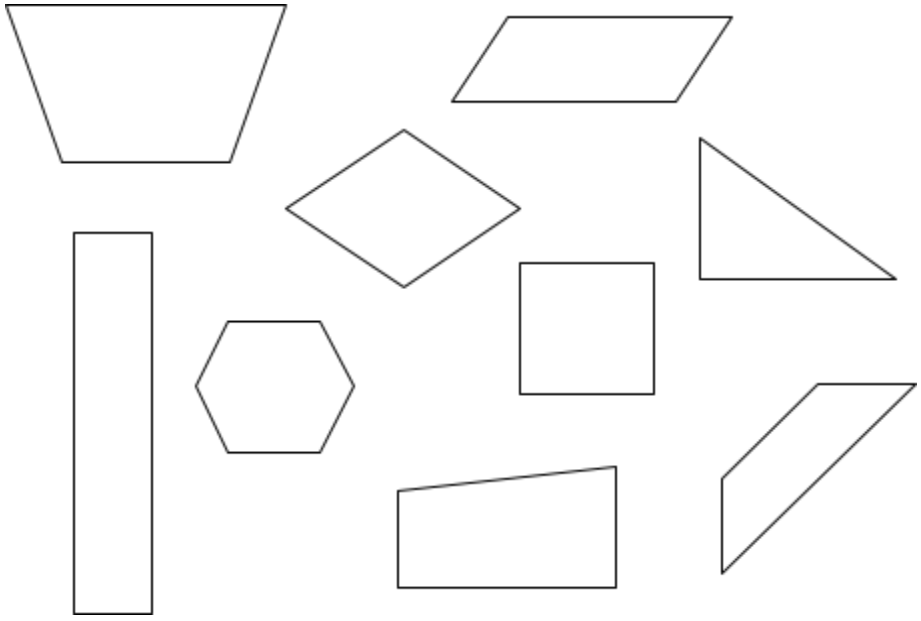


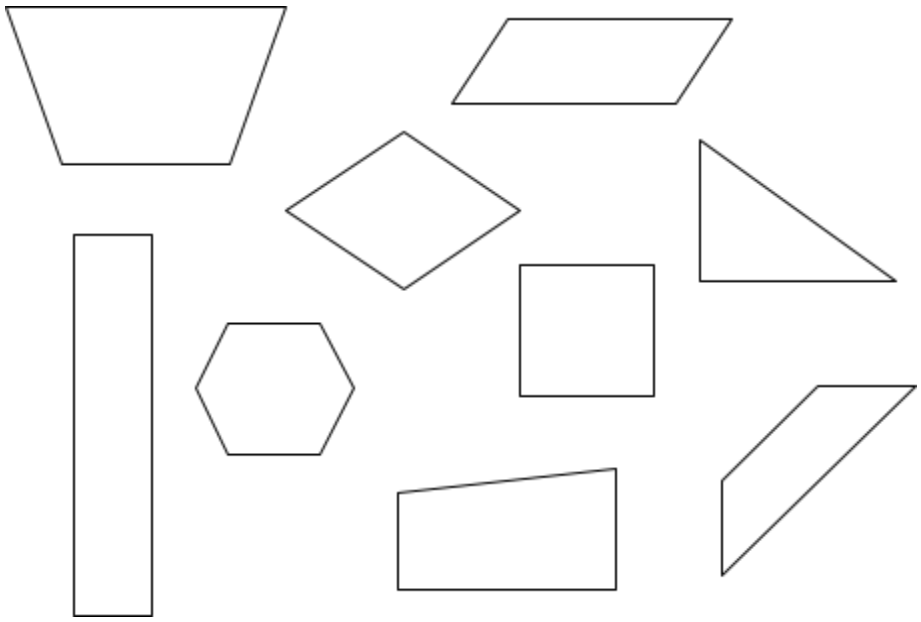
How do you know these shapes are parallelograms?

_____

_____

_____

Which of the following shapes are trapezoids? Shade them in. (Hint: Extend the sides to test whether or not they are parallel.)



How do you know these shapes are trapezoids?

_____

_____

_____

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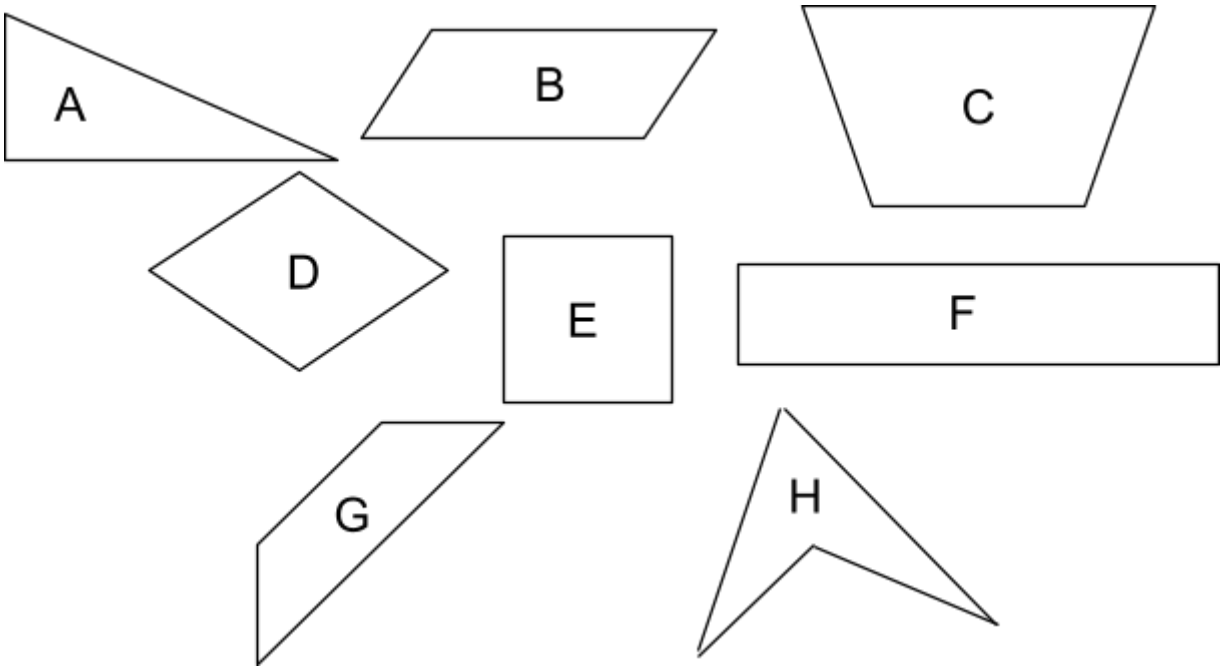
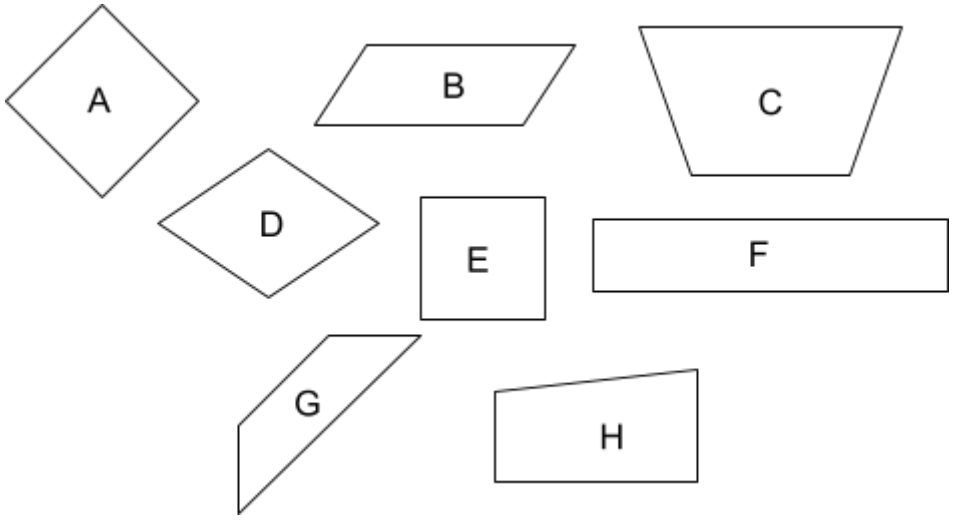


Meredith is looking at the set of shapes below. She cannot figure out if Shape H is just a quadrilateral, or if it is a parallelogram, or a trapezoid. Show Meredith how to figure out what type of shape H is and then tell Meredith the correct name of the shape.



Sort the shapes above into the correct category.

Trapezoids	Parallelograms

Name: Answer Key

How are trapezoids and parallelograms the same?

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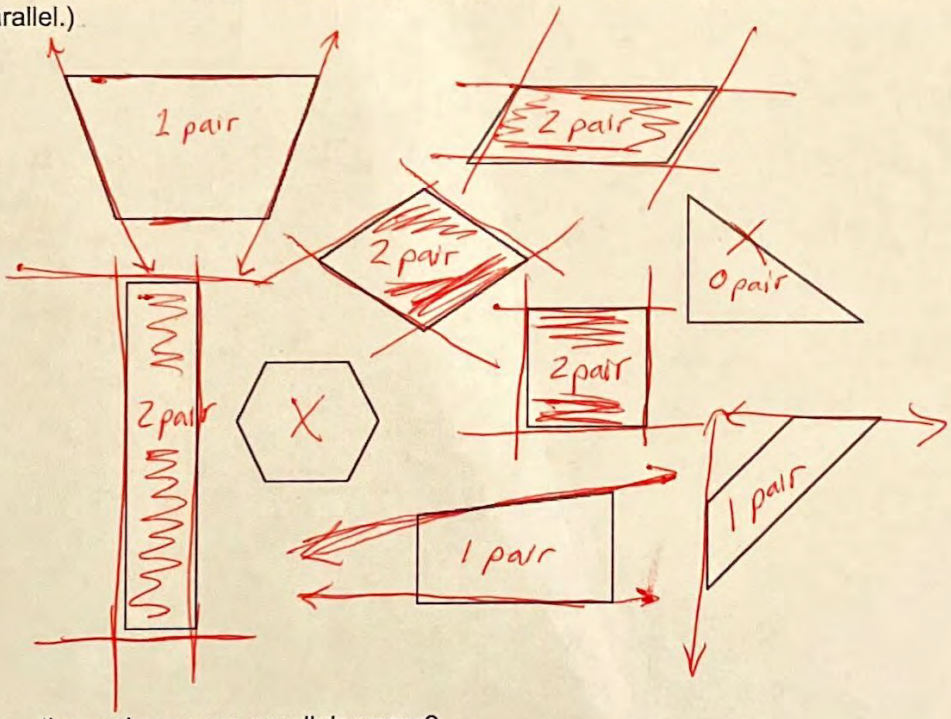
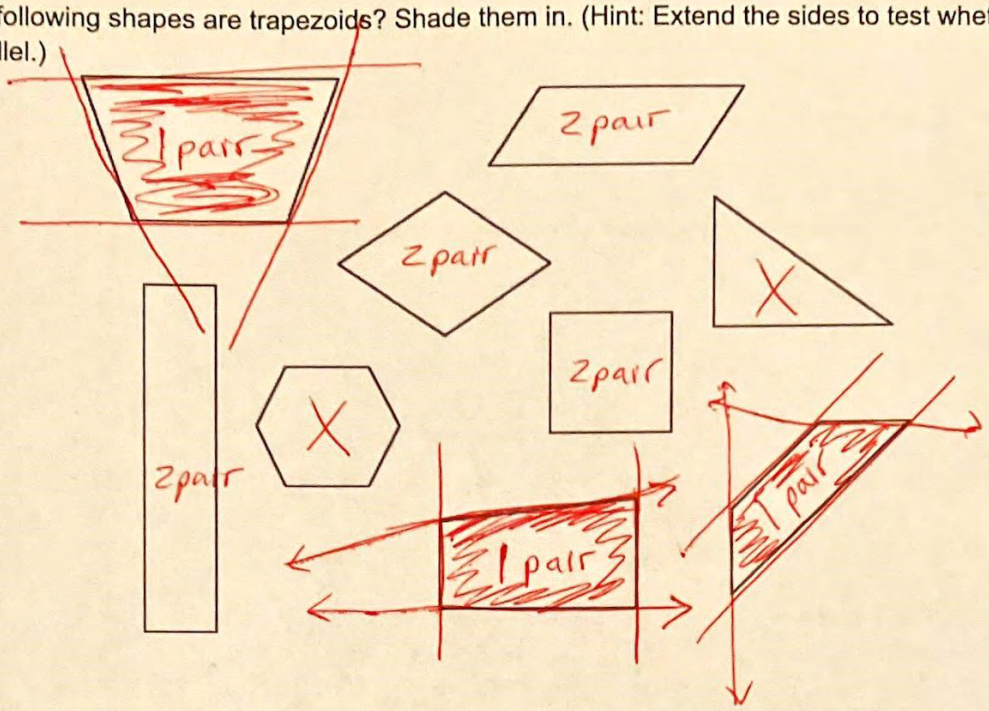
Which of the following shapes are parallelograms? Shade them in. (Hint: Extend the sides to test whether or not they are parallel.)



How do you know these shapes are parallelograms?

These shapes are parallelograms because they are quadrilaterals with two pairs of parallel sides.

Which of the following shapes are trapezoids? Shade them in. (Hint: Extend the sides to test whether or not they are parallel.)



How do you know these shapes are trapezoids?

These shapes are trapezoids because they're quadrilaterals with only one pair of parallel sides.

Name: Answer Key

What does it mean if sides are parallel to each other?

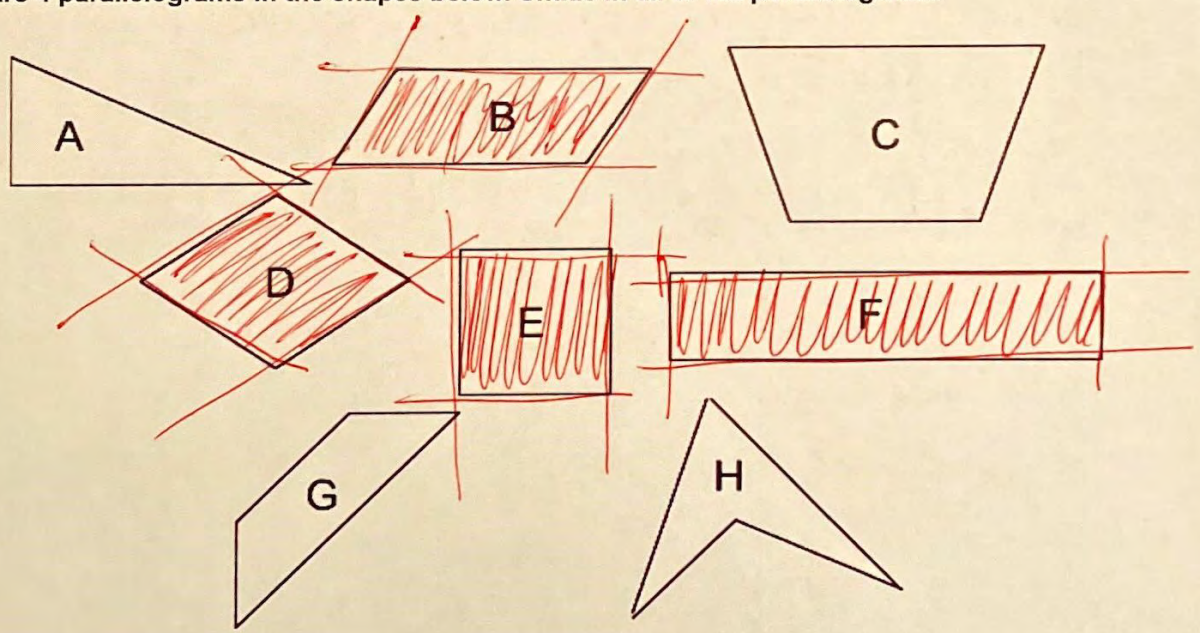
a. The sides are exactly the same length.
b. The sides intersect at a right angle.
c. When extended, the sides will eventually intersect each other.
d. Even when extended, the sides would never intersect with each other.

Select words from the bank to correctly complete the sentences below.

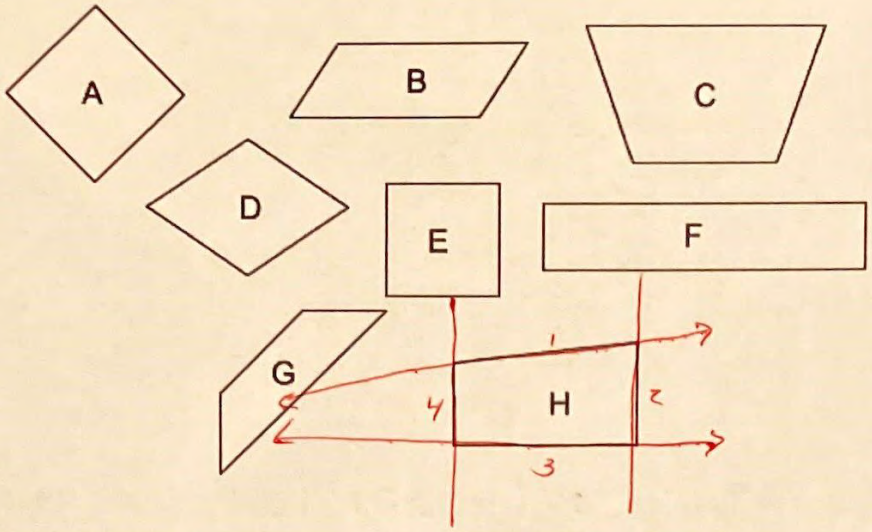
Four	Pentagons	Triangles
One	Quadrilaterals	Two

Parallelograms and trapezoids are both quadrilaterals. However, parallelograms have two pair of parallel sides and trapezoids only have one pair of parallel sides.

There are 4 parallelograms in the shapes below. Shade in all of the parallelograms.



Meredith is looking at the set of shapes below. She cannot figure out if Shape H is just a quadrilateral, or if it is a parallelogram, or a trapezoid. Show Meredith how to figure out what type of shape H is and then tell Meredith the correct name of the shape.



The correct name of shape H is trapezoid. It has four sides, and when you extend the sides, you can tell the top and bottom will intersect, so there is only one pair of parallel sides.

Sort the shapes above into the correct category.

Trapezoids	Parallelograms
C G H	A B D E F

G3 U5 Lesson 4

Describe rectangles

G3 U5 Lesson 4 - Students will describe the attributes of rectangles

Tutor Notes: Today, students will learn about a number of shapes that fall into the parallelogram family. It is important for students to understand the attributes that qualify shapes into certain categories. For example, all parallelograms are quadrilaterals because they have four sides, but they are specifically named parallelograms because they have two pairs of parallel sides. In today's lesson, students will learn about a specific type of parallelogram, the rectangle. A rectangle is classified by having four right angles. There is also an important distinction between rectangles and squares, in which a rectangle has opposite sides congruent while a square has all four sides congruent, but we will explore that specific nuance in a later lesson. Today we will focus on identifying types of angles in the shape to justify naming shapes within the parallelogram family as rectangles.

Warm Welcome (Slide 1): Tutor choice.

Let's Review (Slide 2): We've been working with flat, 2D, shapes and using their attributes to describe them. Yesterday we looked closely at the sides to help us classify quadrilaterals as parallelograms and trapezoids. Today, we'll be looking closely at angles. Remember, angles are formed where two sides meet (*point to angles*).

Frame the Learning/Connect to Prior Learning (Slide 3): The last time we met, we dug deeper into the family of quadrilaterals by analyzing trapezoids and parallelograms. Today we are going to continue that work by looking at a specific kind of parallelogram, the rectangle. Raise your hand if you've heard of a rectangle before. Oh, I see lots of you have heard of a rectangle. Today, we're going to learn the exact attributes that make a rectangle, a rectangle!

Let's Talk (Slide 4): Here we have two objects that probably look familiar to you, an eraser and a gift box. Take a look at the side of each object. **What do you notice about the sides of these objects? What is similar? What is different?** Possible Student Answers, Key Points:

- Both of them have four sides. Both of them have four angles.
- The side of the eraser is slanted but the side of the box is straight.
- The box has straight edges (or square corners) but the eraser doesn't.

Great noticings! You mentioned a few ideas about the eraser being "tilted" or "slanted" while the box is "straight". Those noticings are exactly what we are going to be talking about today when we learn about angles in shapes.

Let's Think (Slide 5): To better understand what makes rectangles unique, we need to first understand the types of angles that we see in shapes. Remember angles are formed where two sides of the shape meet, and that the number of angles is an important attribute of shapes, but we also need to understand the types of angles that the shape has to better classify the shape. There are 3 types of angles, right angles, acute angles, and obtuse angles. I'll show you an example of each one.

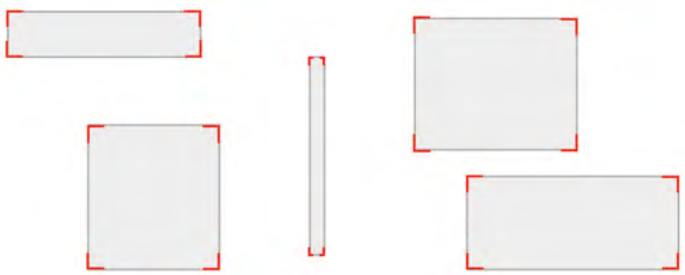
Right angles form a perfect capital L, measuring 90 degrees. You can also imagine the corner of a piece of paper to help you visualize a right angle. Everyone show me a perfect right angle with your arm/elbow.

Let's Talk (Slide 6): Some angles are also called acute angles, which are smaller than the perfect capital L, measuring less than 90 degrees. Show me an acute angle with your arm/elbow.

Note: If students have trouble seeing how this is different from a right angle, draw an L to show how it is more closed than a right angle.

Let's Talk (Slide 7): And finally, we have obtuse angles, which are larger, or more open, than the perfect capital L, measuring more than 90 degrees. Everyone show me an obtuse angle with your arm/elbow.

Let's Think (Slide 8): Let's think about what we just learned about angles. Take a look at the quadrilaterals on the screen–they are ALL rectangles. **What do you notice about the angles in the rectangles?** All of the angles in the rectangles are right angles.



That's right, we see that every shape on here has FOUR right angles!

So, when you were noticing earlier that the side of the gift box was straight or had square corners, you were actually noticing the fact that the side of the box has right angles!

So based on what we have learned so far together about quadrilaterals and special shapes within the quadrilateral family, what do you think are the attributes of a rectangle? Rectangles have to have four sides **and** four right angles. They also have two pairs of parallel sides. That's right, these are special parallelograms called rectangles and they're rectangles because they have four right angles, that perfect L!

Note: It is important for students to understand that the attribute of "4 sides" classifies rectangles as quadrilaterals, "two pairs of parallel sides" classifies it as a parallelogram, but the four right angles classify them even more specifically as rectangles.

You did a great job reasoning with what makes rectangles a special subgroup of parallelograms! Rectangles have four right angles in addition to having two pairs of parallel sides and four sides.

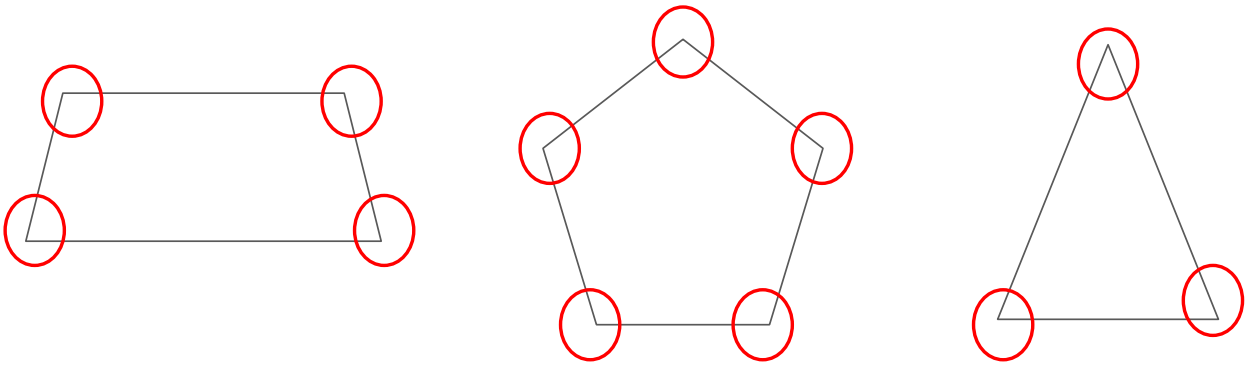
Let's Talk (Slide 9): We are growing our family of quadrilaterals! Last lesson we talked about how parallelograms and trapezoids are kind of like cousins in the quadrilateral family. Today, we discovered that rectangles are kind of like the child of a parallelogram. It shares all the same traits as the parallelogram, but it also has its own attribute that makes it special, just like you might have a lot in common with your parents, but you also have things about you that make you unique and special.

Let's Try it (Slides 10-11): Let's practice our understanding about the attributes of rectangles together. Remember as we work through our practice, we are going to be checking the types of angles that we see in the shapes. Rectangles have all right angles, so we will be looking for the angles that form a perfect capital L shape. We can even use a corner of a piece of paper to help us check the angles.

WARM WELCOME

Let's Review:

Angles are formed where two sides meet.



Today we will describe the attributes of rectangles.

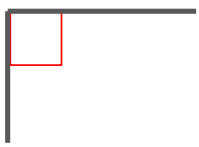
Let's Talk:

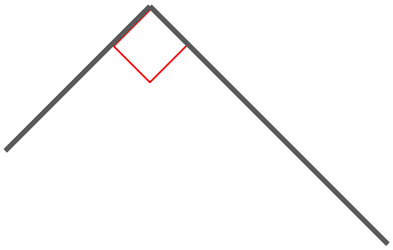
Think about the side of the eraser compared to the side of the gift box.

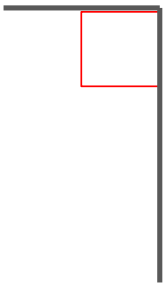
- **What is similar?**
- **What is different?**

Let's Think:

Right Angles: Angles that measure 90 degrees and form a perfect "L"

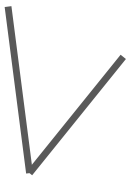


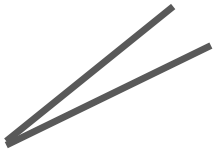




Let's Think:

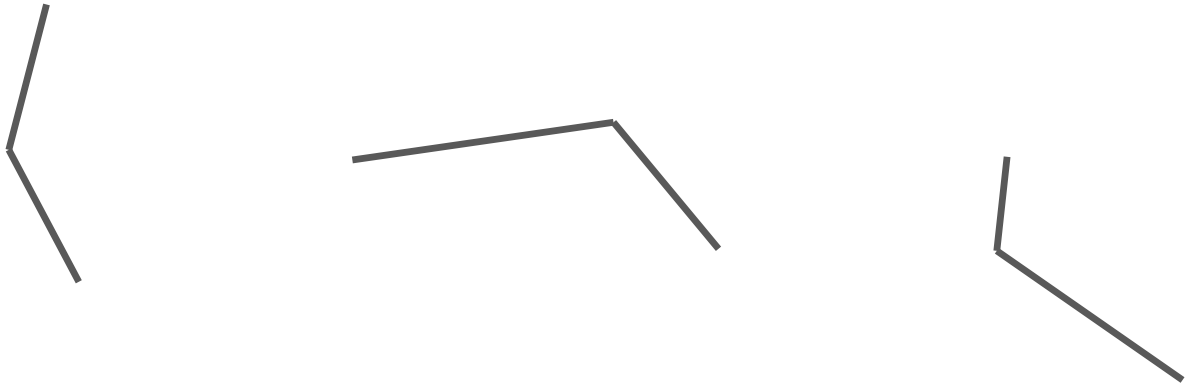
Acute Angles: Angles that measure less 90 degrees, smaller than the perfect "L"



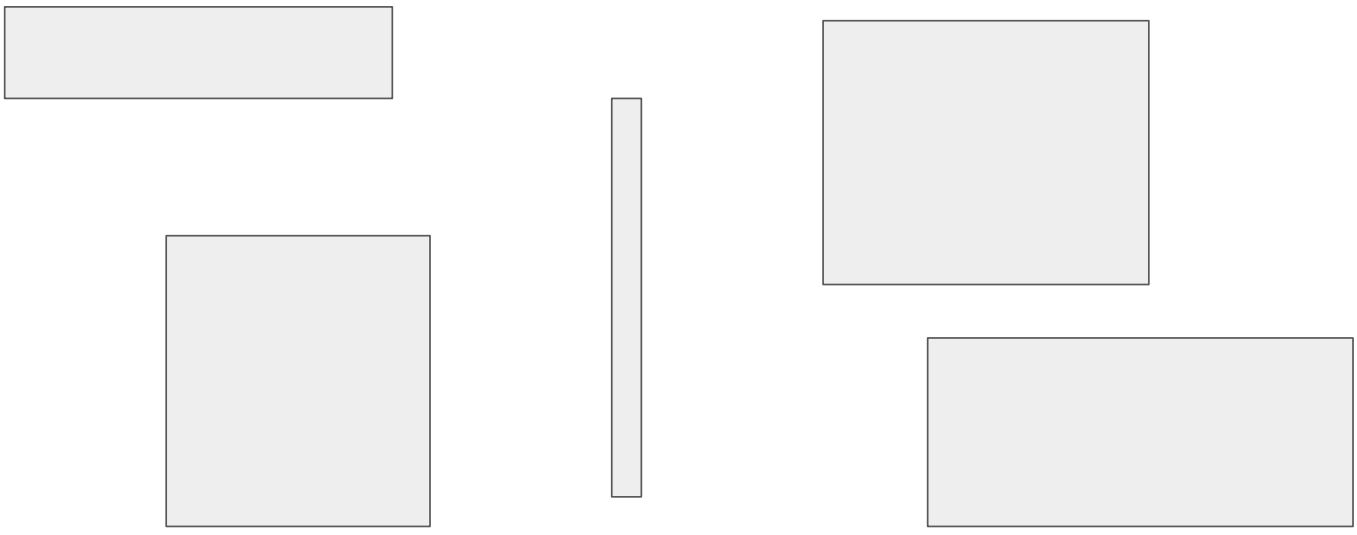


Let's Think:

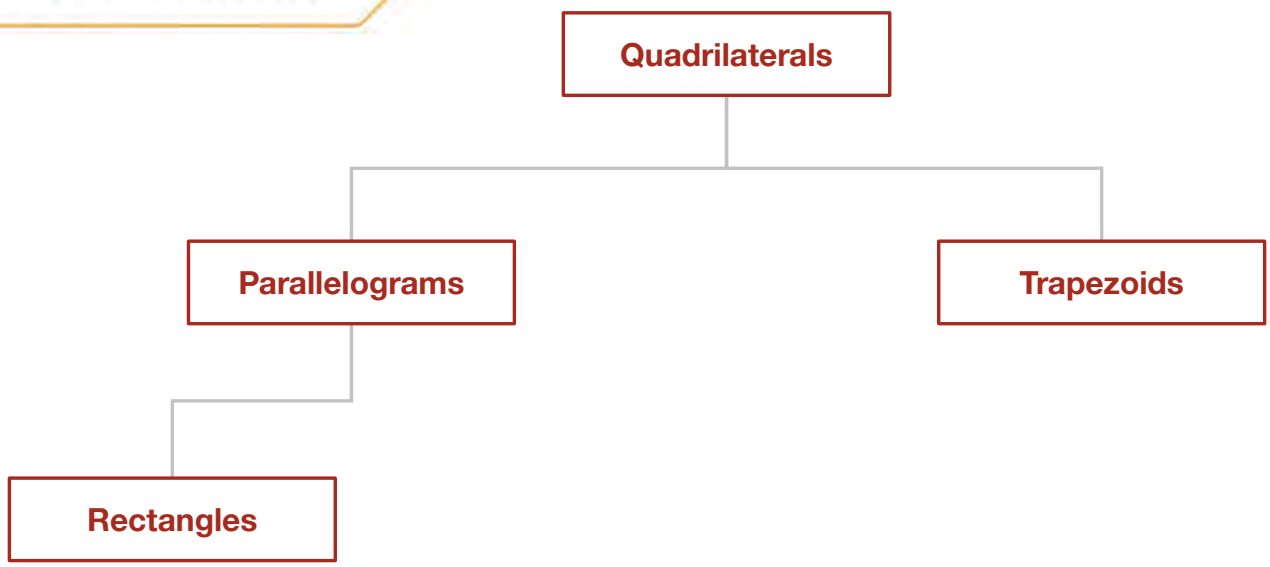
Obtuse angles: Angles that measure more than 90 degrees, larger than the perfect "L"



Let's Think:

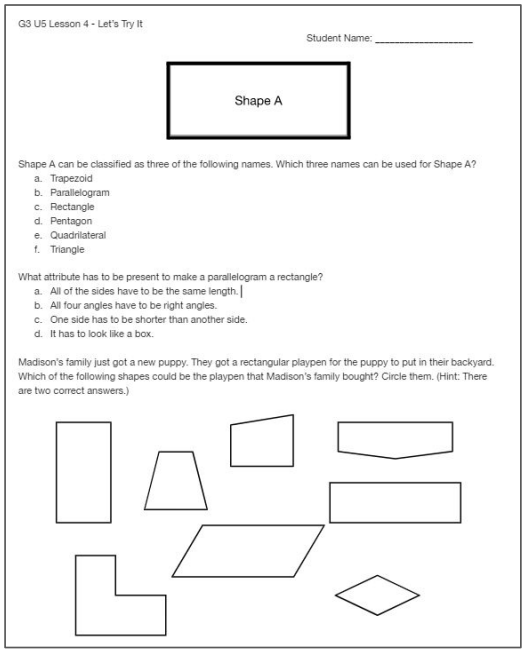


Let's Think:



Let's Try It:

Let's apply our understanding together.



G3 U5 Lesson 4 - Let's Try It

Student Name: _____

Shape A

Shape A can be classified as three of the following names. Which three names can be used for Shape A?

a. Trapezoid
b. Parallelogram
c. Rectangle
d. Pentagon
e. Quadrilateral
f. Triangle

What attribute has to be present to make a parallelogram a rectangle?

a. All of the sides have to be the same length.
b. All four angles have to be right angles.
c. One side has to be shorter than another side.
d. It has to look like a box.

Madison's family just got a new puppy. They got a rectangular playpen for the puppy to put in their backyard. Which of the following shapes could be the playpen that Madison's family bought? Circle them. (Hint: There are two correct answers.)

On your Own: Let's try on our own.

G3 U5 Lesson 4 - On Your Own

Student Name: _____

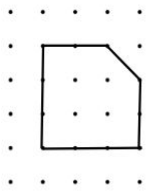
What is a right angle?

a. An angle that measures exactly 90 degrees or the perfect L
b. Angles that can be added together in a shape to equal 90 degrees
c. An angle that is less than 90 degrees or the perfect L
d. An angle that is more than 90 degrees or the perfect L

Which of the following correctly lists the attributes of rectangles?

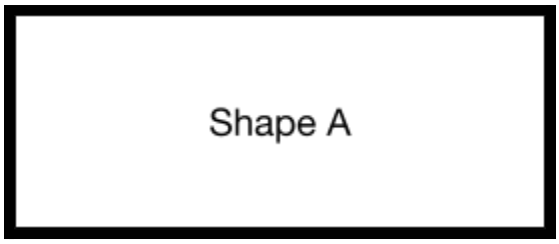
a. Three sides and three angles
b. Four sides and all sides the same length
c. Four sides, two pairs of parallel sides, and all right angles
d. Four sides, two pairs of parallel sides, and acute and obtuse angles

Damian drew the shape below in his notebook and said, "I drew a rectangle with right angles!". Why isn't Damian's shape a rectangle? Explain in words and then draw a picture of a rectangle to help Damian.

Damian's Drawing	Your Drawing:
	

Explanation: Damian's shape is not a rectangle because _____

_____



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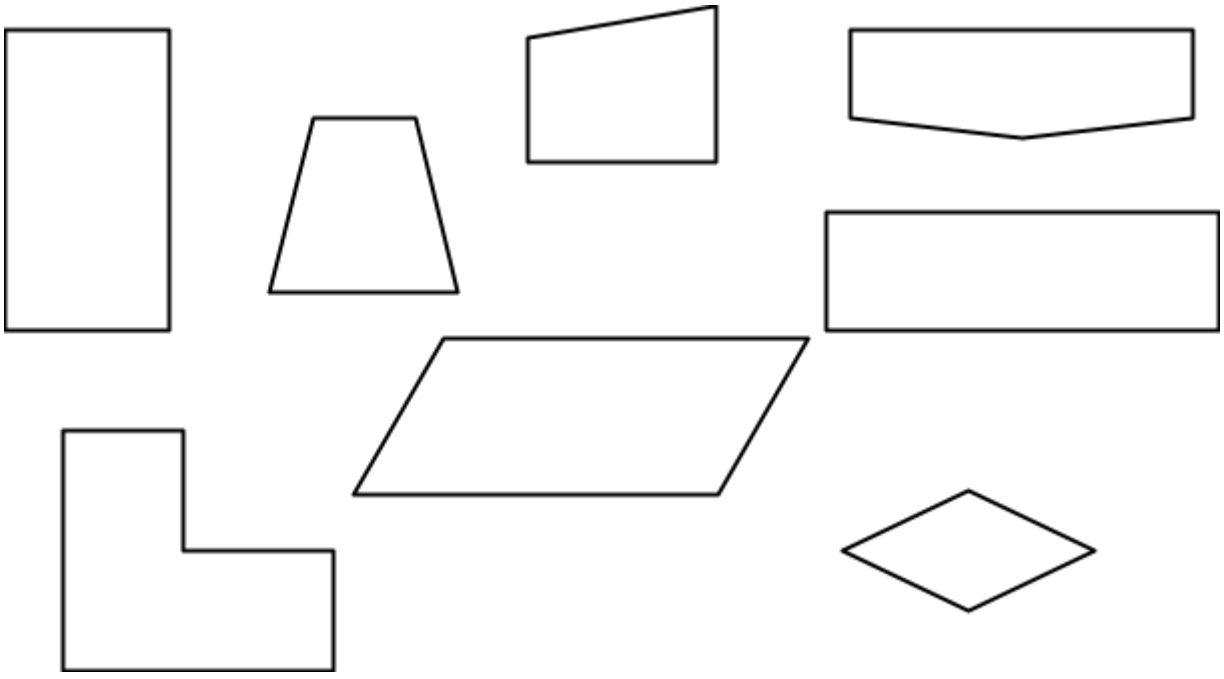
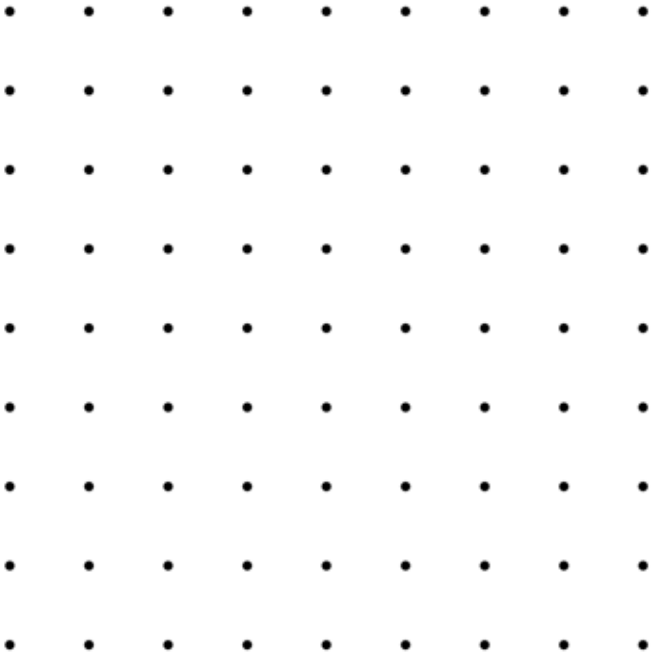
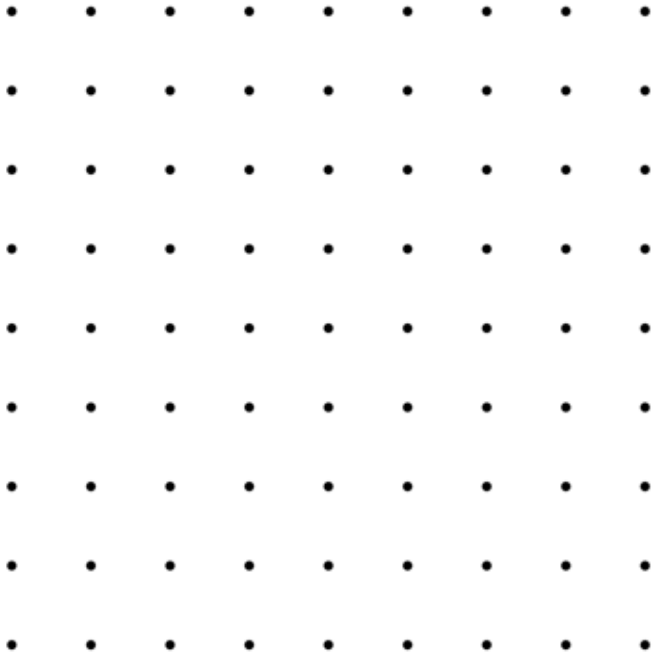


Use the dot grid below to draw **two examples of rectangles** and **two other quadrilaterals** that are **not** rectangles.

Rectangles	Other quadrilaterals
	

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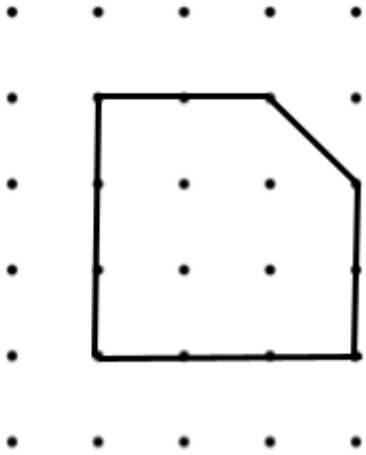	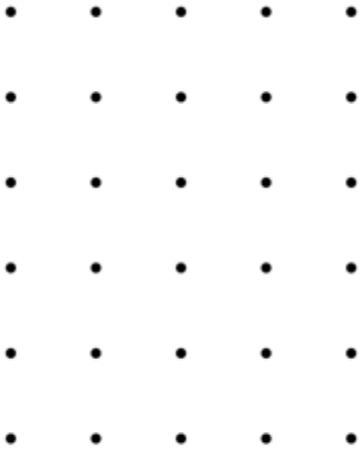
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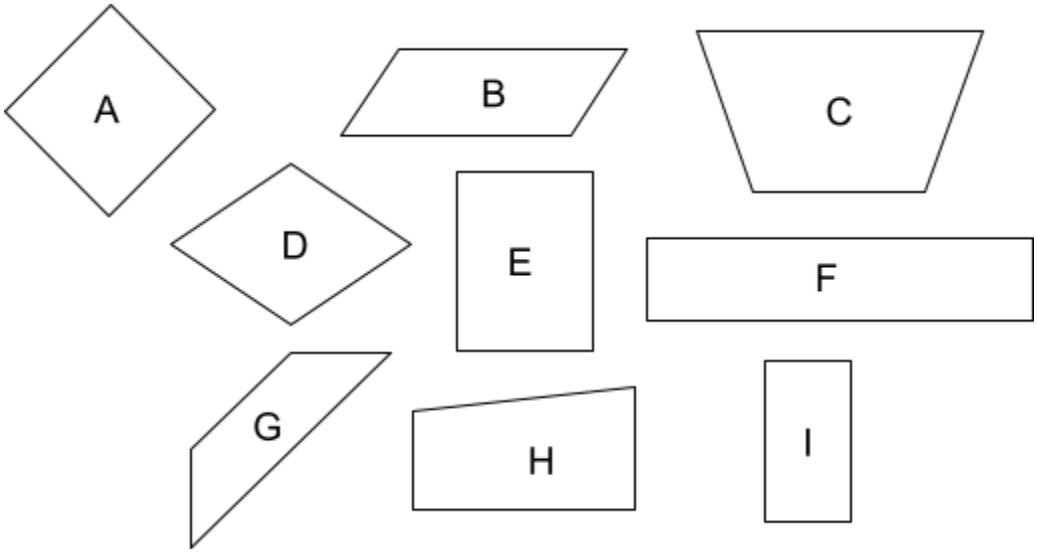
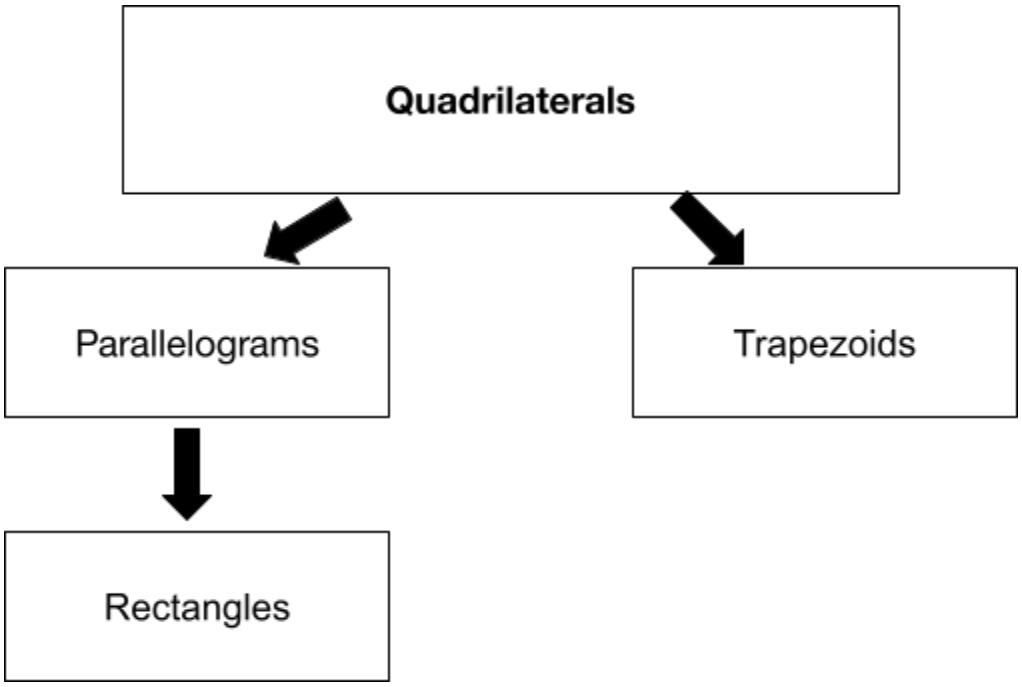
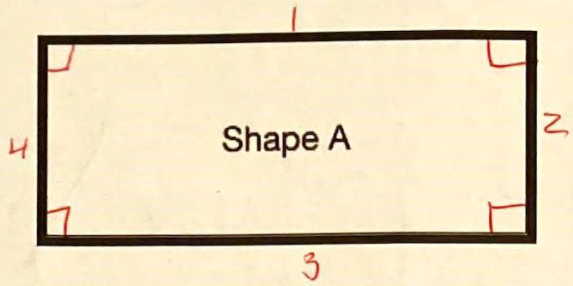
Sort the shapes below into the chart by writing the letters in the correct categories. (Hint: Some shapes will be listed in more than one category based on their attributes.)





Student Name: Answer Key



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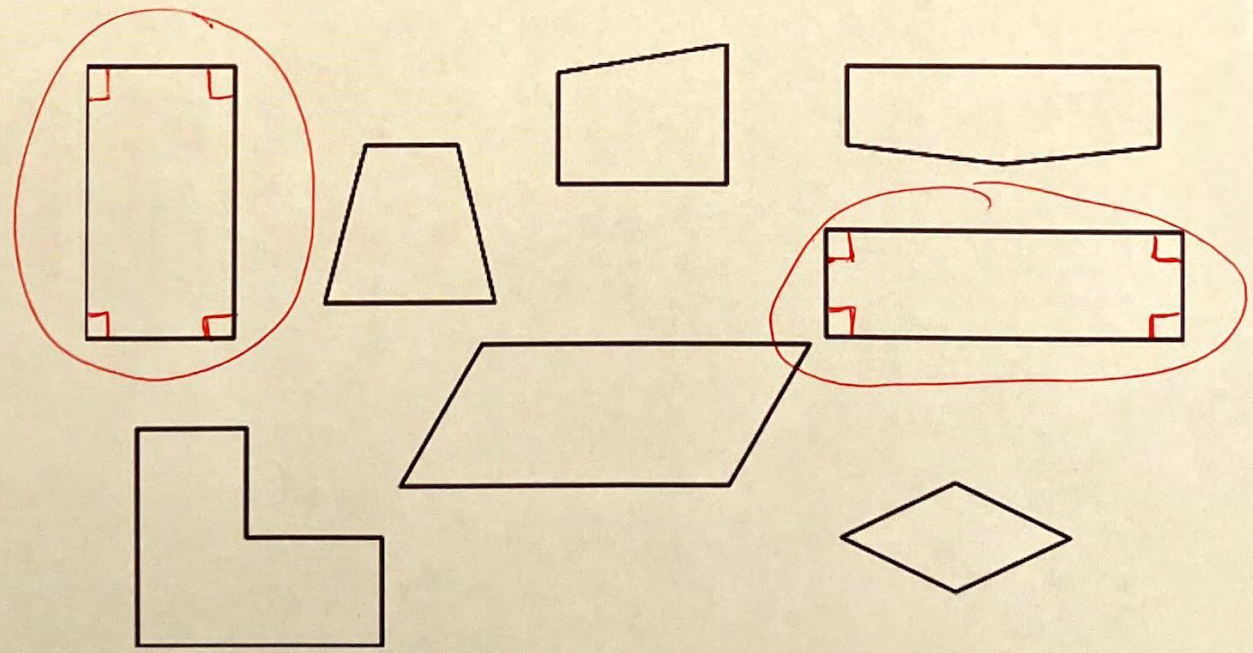

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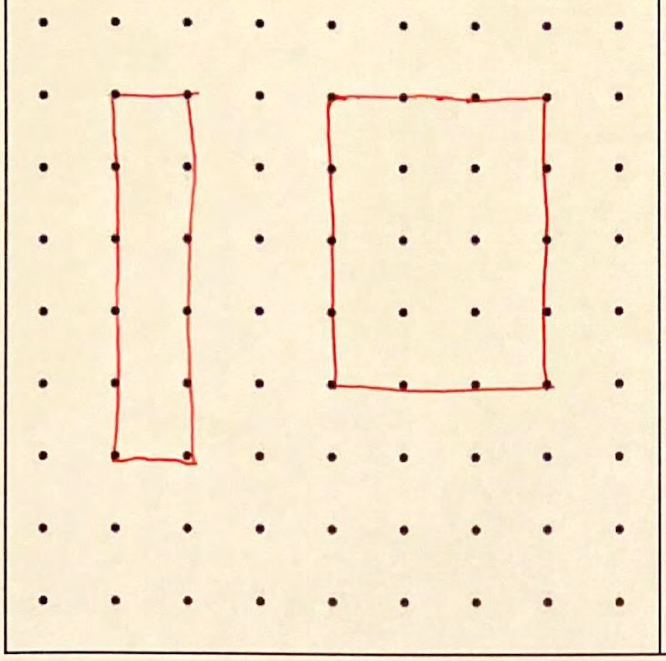	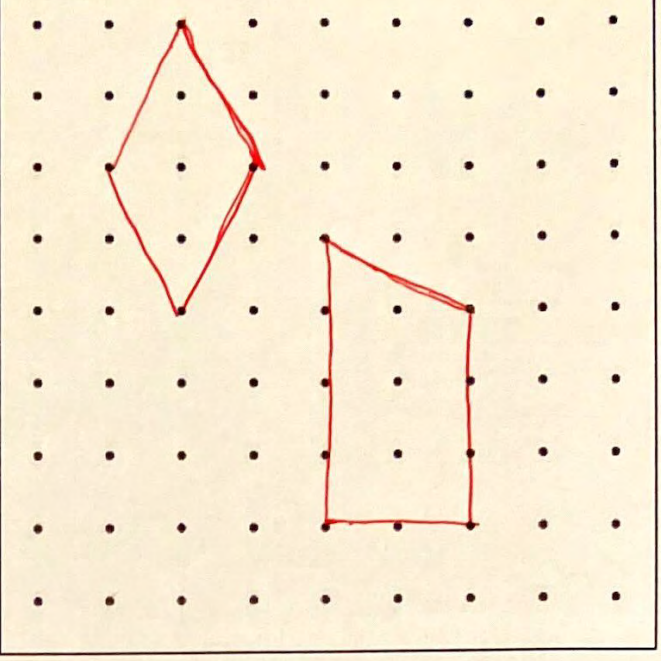

Student Name: Answer Key

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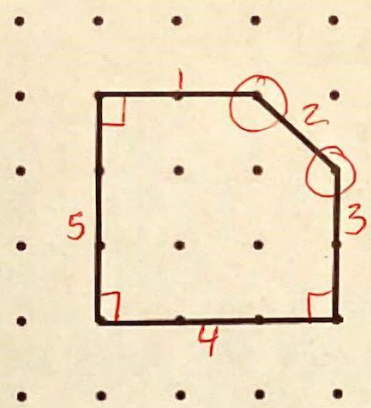
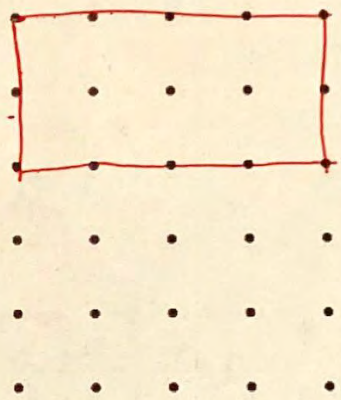
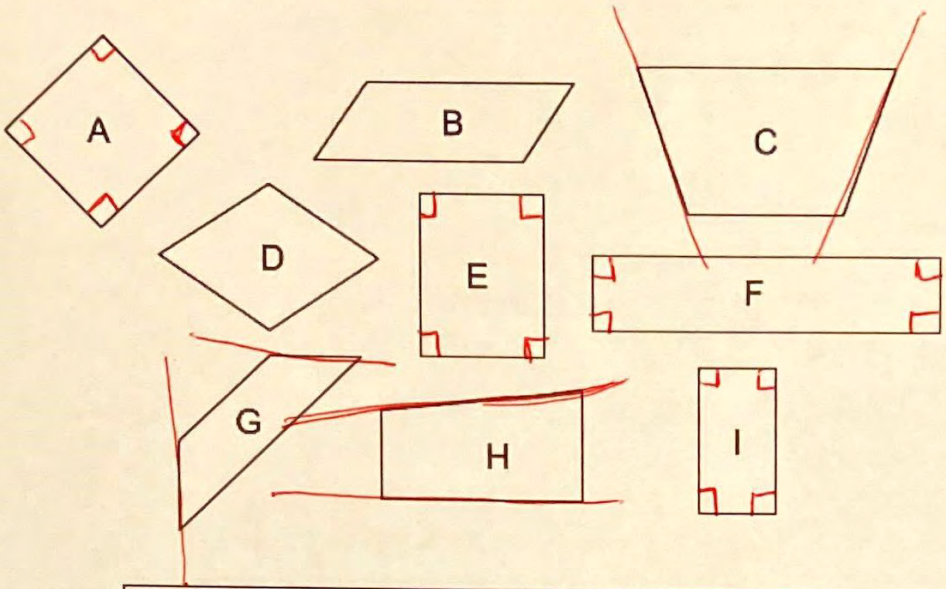
	

Explanation: Damian's shape is not a rectangle because it has 5 sides and two angles that are not right angles

Sort the shapes below into the chart by writing the letters in the correct categories. (Hint: Some shapes will be listed in more than one category based on their attributes.)



Quadrilaterals
A B C D E F G H I

Parallelograms
A B D E F I

Trapezoids
C G H

Rectangles
A E F

G3 U5 Lesson 5

Describe rhombuses

G3 U5 Lesson 5 - Students will describe the attributes of rhombuses.

Tutor Notes: In today's lesson, students will continue to learn about another subcategory of parallelograms, rhombuses. Students regularly will refer to a rhombus as a diamond, but encourage them to use the precise terminology for shapes and attributes. Rhombuses are unique in the parallelogram family because they have four sides that are congruent, or of equal length, in addition to opposite angles that are congruent. A lot of conceptual understanding of geometry skills in third grade is grounded in understanding vocabulary, so throughout the lessons, encourage students to restate thinking or responses with the most precise and accurate vocabulary terms possible. This will support them as they begin to reason with statements like, "A square can be a rectangle or a rhombus, but a rhombus and a rectangle cannot be a square." The more they understand words like congruent, angles, and parallel, the better equipped they are to explain their thinking.

Materials:

- Rhombuses for model for every student

Warm Welcome (Slide 1): Tutor choice.

Frame the Learning/Connect to Prior Learning (Slide 2): The last time we met, we discussed a specific type of parallelogram…rectangles. We learned that rectangles are a type of parallelogram that have 4 right angles! Today we are going to talk about a different type of parallelogram, rhombuses.

Let's Talk (Slide 3): First, let's take a look at some common objects I have pictured on the slide. We have a whiteboard, a chocolate bar, a window, and a pair of earrings. Some of these objects are examples of rectangles and some are not. **Which objects are rectangles? How do you know? Which of the objects are not rectangles? How do you know? What makes them different from a rectangle?** Possible Student Answers, Key Points:

- The chocolate bar is a rectangle, I see 2 sets of parallel lines and 4 right angles!
- The whiteboard is a rectangle!
- The window and the earrings are not rectangles.
- They are not rectangles because they do not have right angles.
- They are different because they have acute and obtuse angles.

Let's Talk (Slide 4): Before we look closely at rhombuses, we need to first understand what it means for sides and angles to be **congruent**. Let's look at the images on the screen and see if we can figure out what it means for something to be congruent. I'm going to read a sentence and I want you to study what I'm describing to see if you can figure out what congruent means.

- These two lines (*point),* are congruent.
- These two angles (*point)* are congruent.
- And this parallelogram (*point)* has opposite sides that are congruent.

Based on what you see here, what do you think congruent means? They are the same size. Right! Congruent means THE EXACT SAME! Do you see how this parallelogram has little tick marks on opposite sides? That is telling you that the two sides are the same length. This side with one tick mark (*point*) is congruent, or the same, as the opposite side with one tick mark.

Let's Think (Slide 5): Let's take a look at a rhombus and see if we can find some parts of the rhombus that are congruent. You can use the two paper rhombuses to investigate what might be congruent. You can try bending or folding the rhombus if that helps you test out what might be congruent.

Note: Provide the student the two cut-out model rhombuses from the lesson materials. Encourage the student to fold or manipulate the rhombus in different ways to see if they can figure out any sides or angles that may

be congruent. If the student struggles to identify anything, remind the student, "Let's think about attributes of the rhombus like sides and angles to see if we can find anything that is congruent." Model folding one of the rhombuses in half and asking the student what they notice.

What matches up perfectly, showing us that it is congruent? Possible Student Answers, Key Points:

- All four sides are congruent to each other.
- The top and bottom angles are congruent.
- The side angles are congruent.
- Opposite angles are congruent in a rhombus.

Let's Think (Slide 6): Great job reasoning with the rhombuses to figure out that all four sides are congruent, or the same length. If we think back to our opening pictures with the window and the earrings, we could notice that all of their sides are the same length.

Let's Think (Slide 7): You also saw that the top and bottom angles are congruent or the same size. Again, if we imagined folding that window or the earrings in half, we could see that the opposite angles match up with each other, showing us they are congruent.

Let's Think (Slide 8): And you noticed the same to be true about the side angles. So, we can say that a rhombus has four congruent sides and opposite angles are congruent.

Let's Think (Slide 9): Rhombuses are a part of the quadrilateral family because they have four sides. They are also part of the parallelogram family, because they have two sets of parallel sides. However, they are in a different subgroup of parallelograms than rectangles, because they have some attributes that are different from rectangles.

Let's Try it (Slides 10): So now we have figured out that a rhombus is both a quadrilateral and a parallelogram, but we specifically classify it as a rhombus because it has four congruent sides and opposite angles that are congruent. Let's practice applying this understanding of the attributes of a rhombus together.

WARM WELCOME

Today we will describe the attributes of rhombuses.

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Let's Talk:

Consider the objects above: a window, a whiteboard, a chocolate bar, and a pair of earrings.

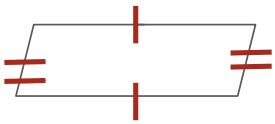
- Which objects are rectangles? How do you know?
- Which objects are not rectangles? How do you know?

Let's Think:

What does it mean for sides and angles to be **congruent**?

These lines are **congruent**.

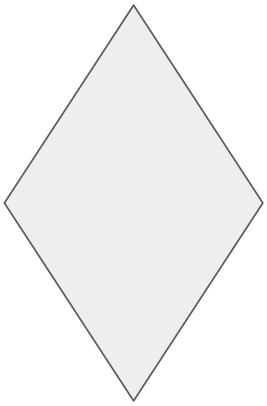
These angles are **congruent**.



This parallelogram has opposite sides that are **congruent**.

Let's Think:

What do you notice in the rhombus that is congruent?



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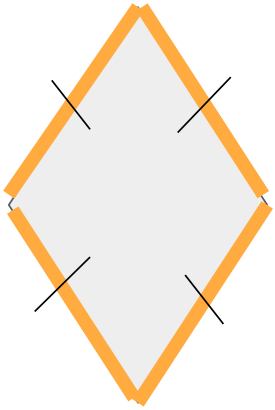

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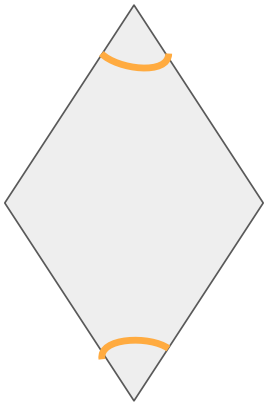

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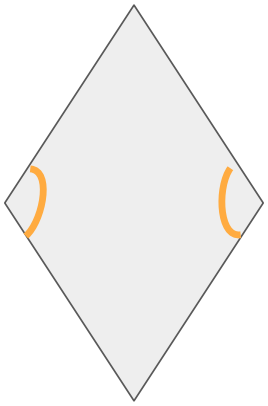

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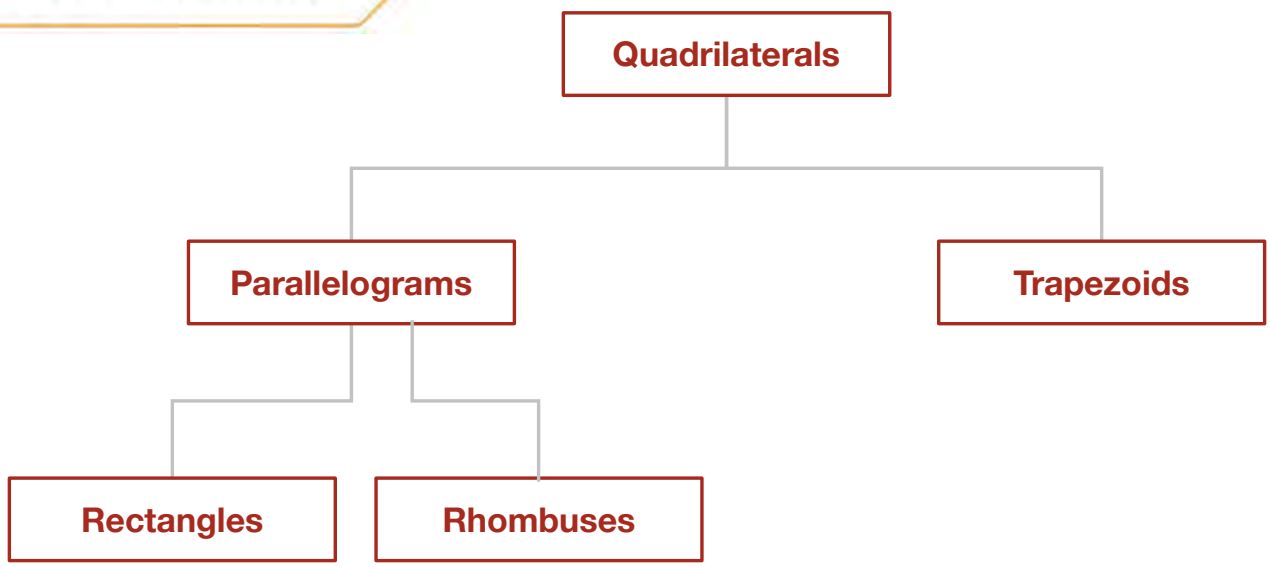
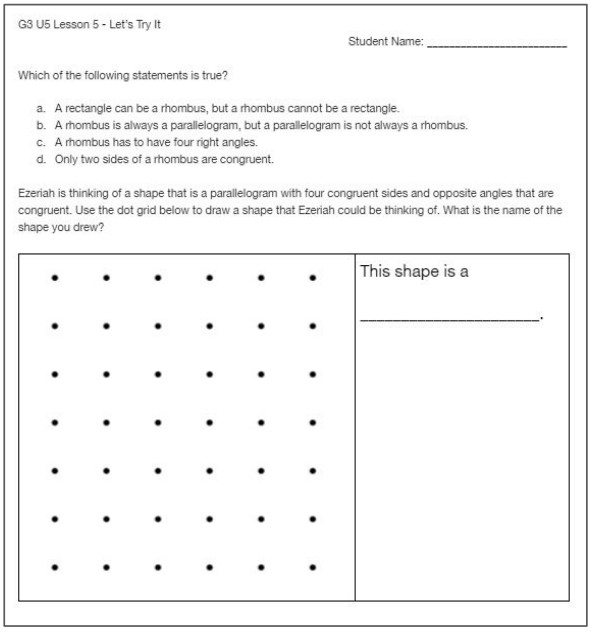


Let's Try It:

Let's apply our understanding together.



G3 U5 Lesson 5 - Let's Try It

Student Name: _____

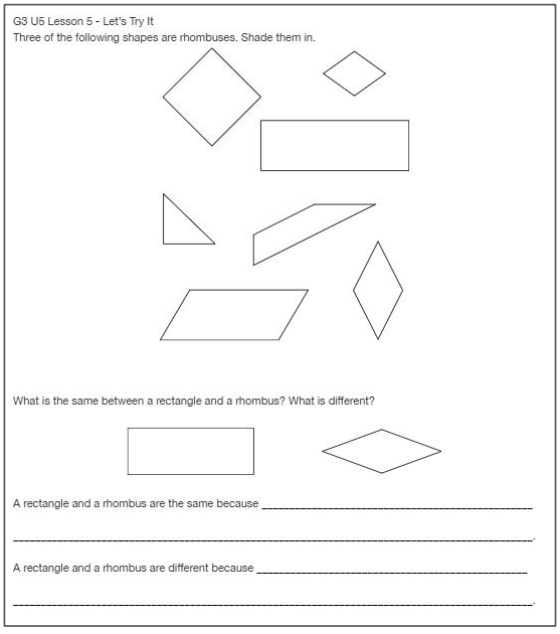
Which of the following statements is true?

a. A rectangle can be a rhombus, but a rhombus cannot be a rectangle.
b. A rhombus is always a parallelogram, but a parallelogram is not always a rhombus.
c. A rhombus has to have four right angles.
d. Only two sides of a rhombus are congruent.

Ezeriah is thinking of a shape that is a parallelogram with four congruent sides and opposite angles that are congruent. Use the dot grid below to draw a shape that Ezeriah could be thinking of. What is the name of the shape you drew?

This shape is a

_____.



G3 U5 Lesson 5 - Let's Try It

Three of the following shapes are rhombuses. Shade them in.

What is the same between a rectangle and a rhombus? What is different?

A rectangle and a rhombus are the same because _____

_____.

A rectangle and a rhombus are different because _____

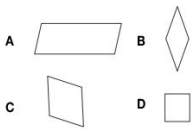
_____.

On your Own: Let’s try on our own.

G3 U5 Lesson 5 - On Your Own

Student Name: _____

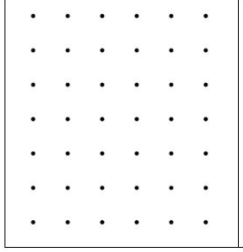
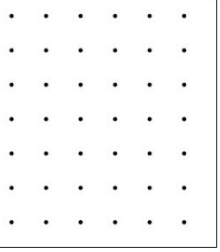
Which of the following shapes is **not** a rhombus?



Amiya and Malachi are describing shapes to each other. Use what you know about the attributes of quadrilaterals to draw the shapes that Amiya and Malchi are describing.

a. Amiya: *"I'm thinking of a shape that is a quadrilateral, but it is not a parallelogram. It has two acute angles and two obtuse angles. It has one pair of parallel sides."*

b. Malachi: *"I'm thinking of a shape that is both a quadrilateral and a parallelogram. All of its sides are congruent and its opposite angles are congruent too."*

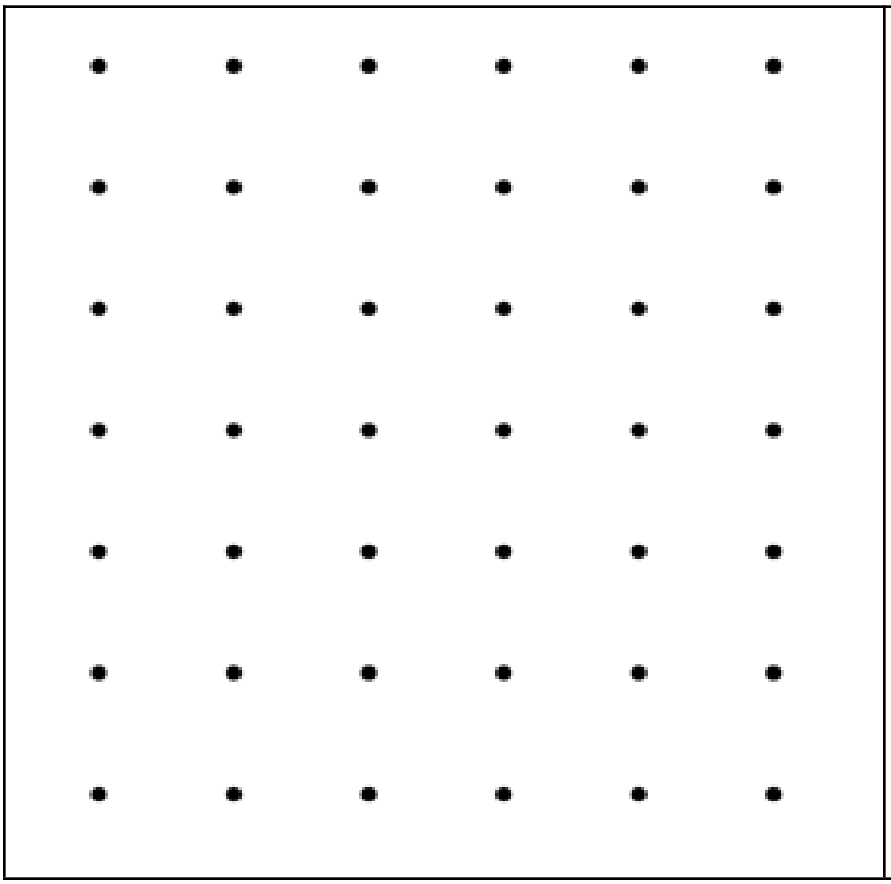
Amiya's Shape	Malachi's Shape
	

Student Name: _____ G3 U5 Lesson 5 - Let's Try It

Which of the following statements is true?

a. A rectangle can be a rhombus, but a rhombus cannot be a rectangle.
b. A rhombus is always a parallelogram, but a parallelogram is not always a rhombus.
c. A rhombus has to have four right angles.
d. Only two sides of a rhombus are congruent.

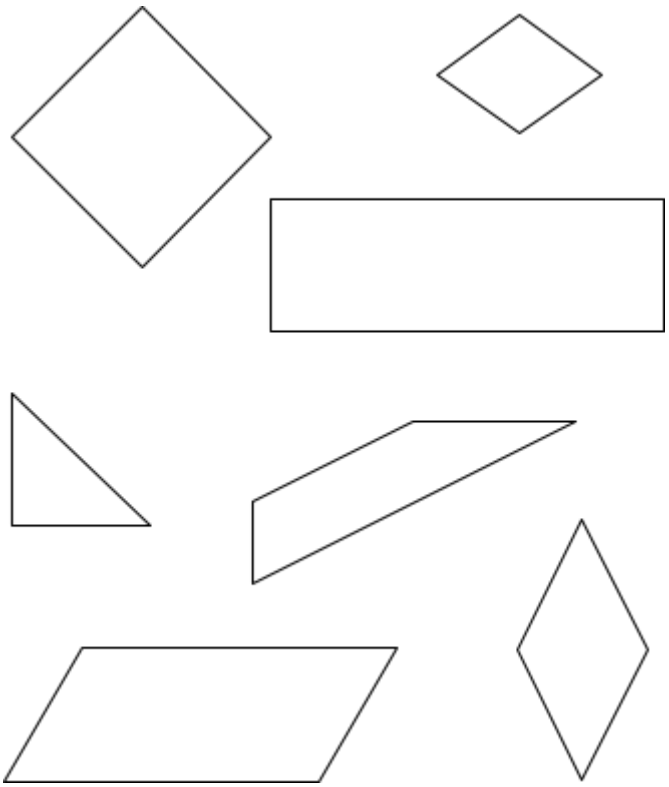
Ezeriah is thinking of a shape that is a parallelogram with four congruent sides and opposite angles that are congruent. Use the dot grid below to draw a shape that Ezeriah could be thinking of. What is the name of the shape you drew?



This shape is a

_____.

Three of the following shapes are rhombuses. Shade them in.



What is the same between a rectangle and a rhombus? What is different?

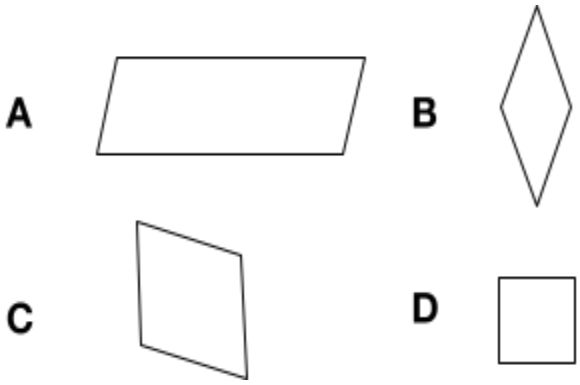
A rectangle and a rhombus are the same because _____

_____.

A rectangle and a rhombus are different because _____

_____.

Which of the following shapes is **not** a rhombus?



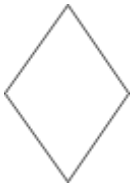
Amiya and Malachi are describing shapes to each other. Use what you know about the attributes of quadrilaterals to draw the shapes that Amiya and Malchi are describing.

a. Amiya: *"I'm thinking of a shape that is a quadrilateral, but it is not a parallelogram. It has two acute angles and two obtuse angles. It has one pair of parallel sides."*

b. Malachi: *"I'm thinking of a shape that is both a quadrilateral and a parallelogram. All of its sides are congruent and its opposite angles are congruent too."*

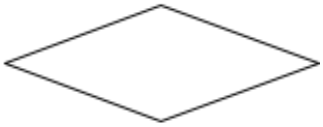
Amiya's Shape	Malachi's Shape

The shape below can be classified as three of the following. Select the three names that can apply to the shape.



a. Pentagon
b. Parallelogram
c. Trapezoid
d. Rectangle
e. Quadrilateral
f. Square
g. Rhombus

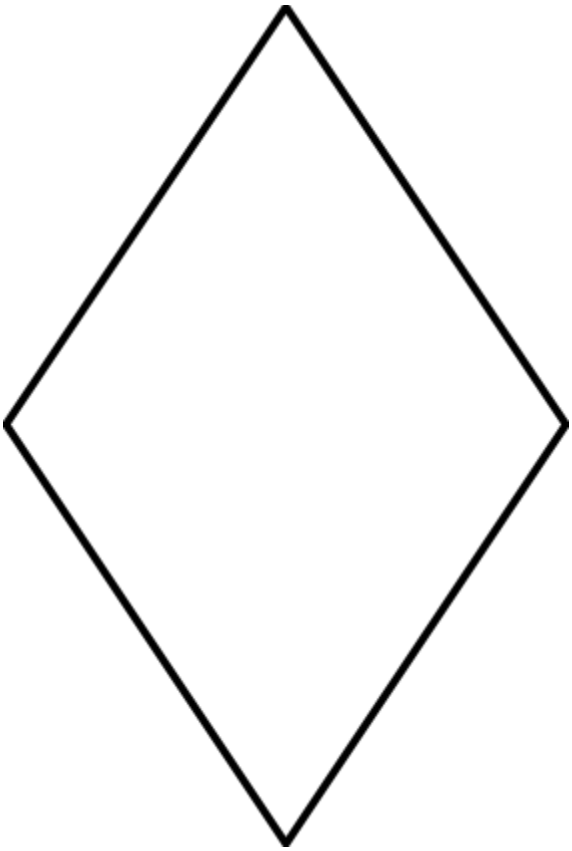
Why can't a rhombus be part of the trapezoid family? Explain your thinking using the shapes below and a written statement.

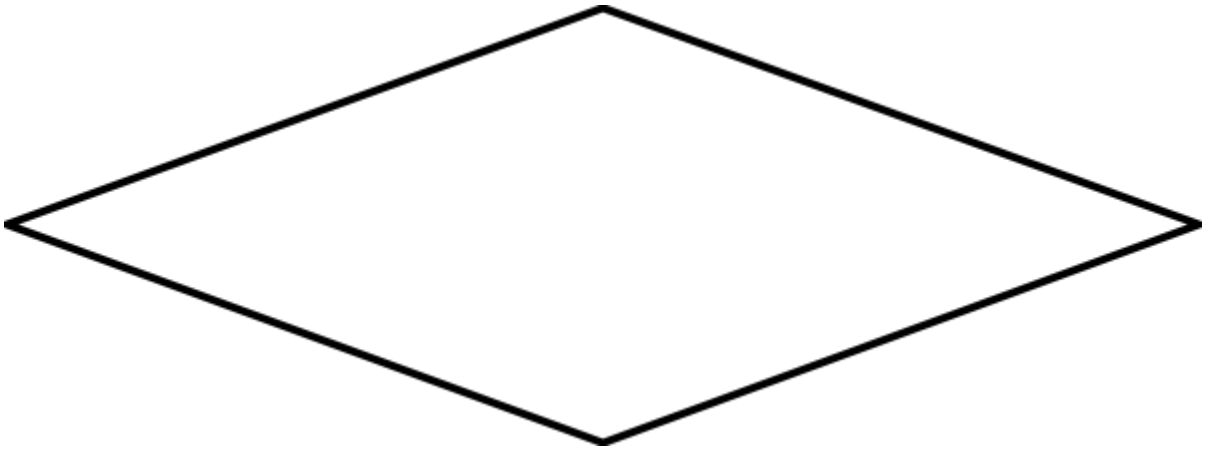


A rhombus can't be part of the trapezoid family because _____

_____

_____.

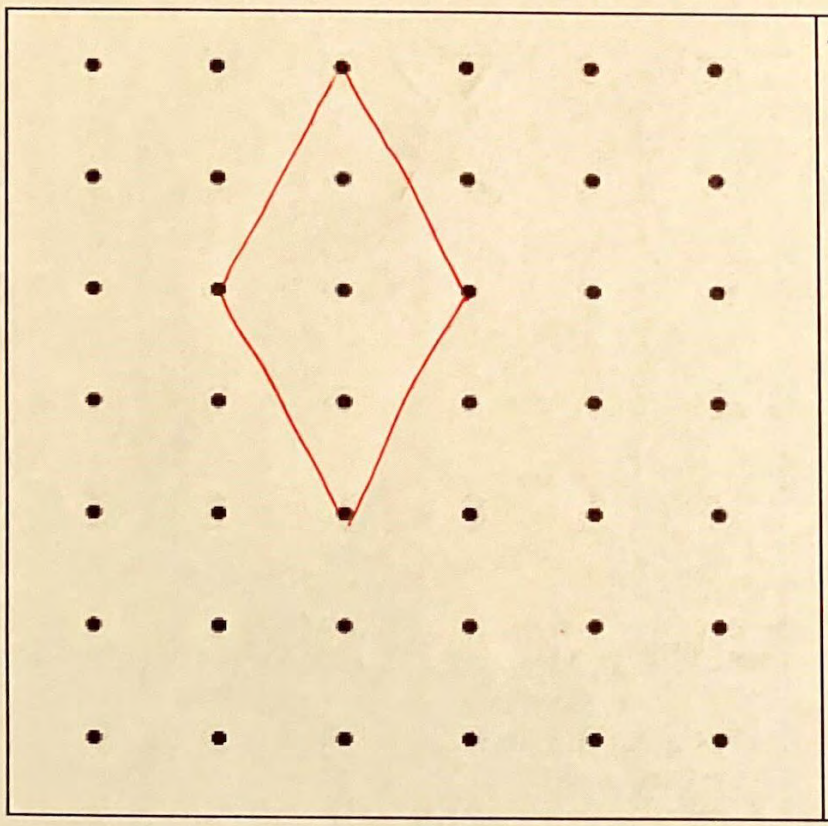




Which of the following statements is true?

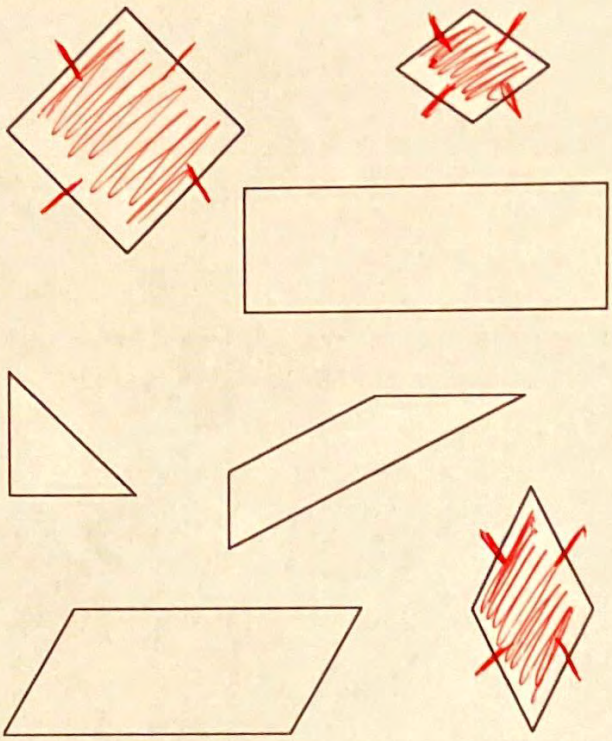
a. A rectangle can be a rhombus, but a rhombus cannot be a rectangle.
b. A rhombus is always a parallelogram, but a parallelogram is not always a rhombus.
c. A rhombus has to have four right angles.
d. Only two sides of a rhombus are congruent.

Ezeriah is thinking of a shape that is a parallelogram with four congruent sides and opposite angles that are congruent. Use the dot grid below to draw a shape that Ezeriah could be thinking of. What is the name of the shape you drew?

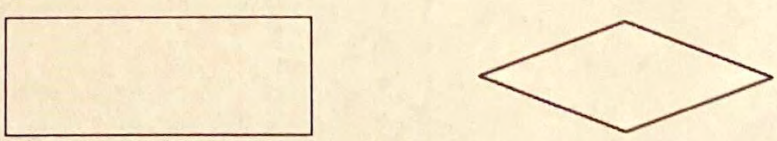


This shape is a rhombus.

Three of the following shapes are rhombuses. Shade them in.



What is the same between a rectangle and a rhombus? What is different?



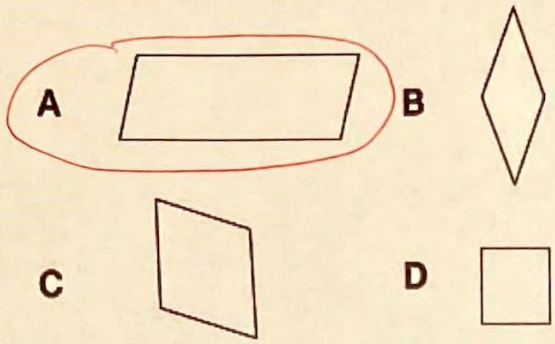
A rectangle and a rhombus are the same because they are both parallelograms.

A rectangle and a rhombus are different because a rhombus has 4 congruent sides but a rectangle has congruent opposite sides.

Student Name: Answer Key

G3 U5 Lesson 5 - Independent Work

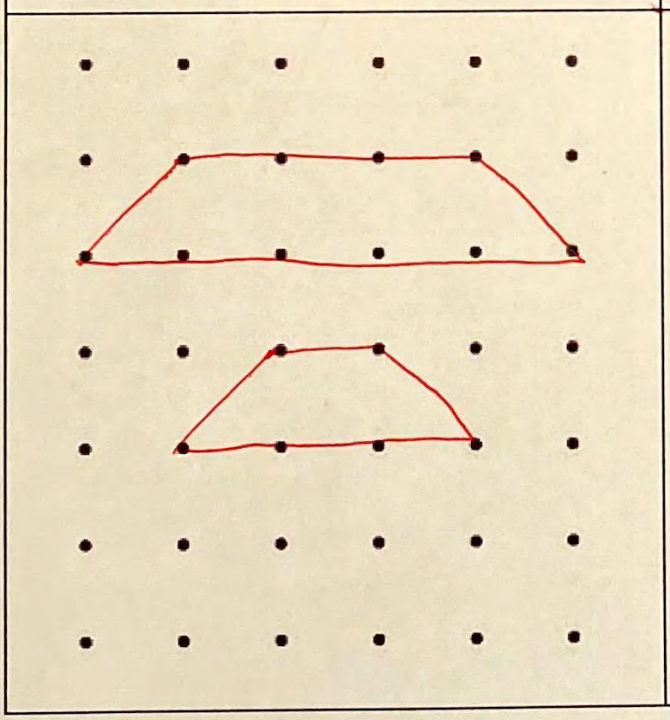
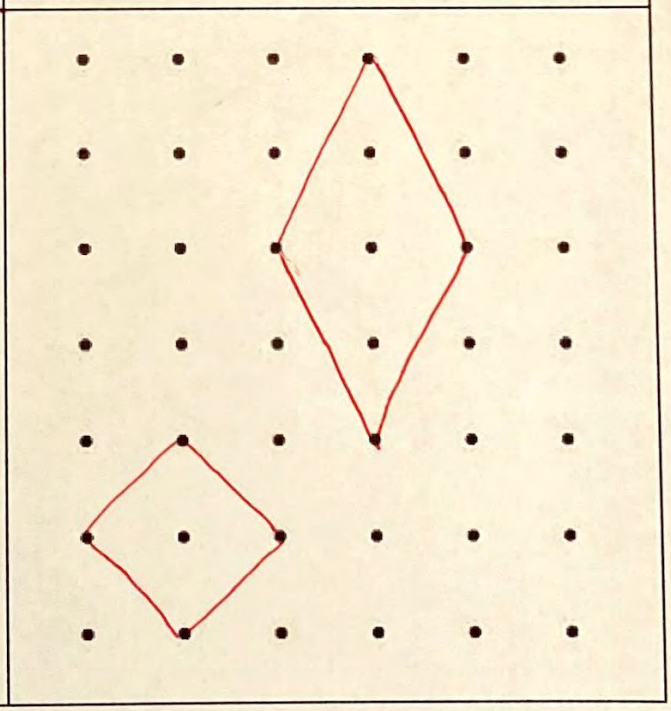
Which of the following shapes is **not** a rhombus?



Amiya and Malachi are describing shapes to each other. Use what you know about the attributes of quadrilaterals to draw the shapes that Amiya and Malchi are describing.

a. Amiya: *"I'm thinking of a shape that is a quadrilateral, but it is not a parallelogram. It has two acute angles and two obtuse angles. It has one pair of parallel sides."*

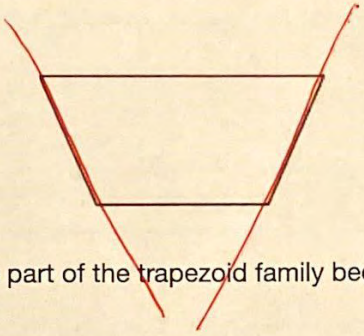
b. Malachi: *"I'm thinking of a shape that is both a quadrilateral and a parallelogram. All of its sides are congruent and its opposite angles are congruent too."*

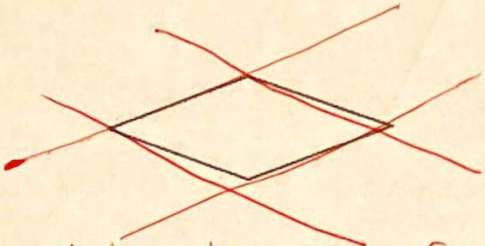
Amiya's Shape	Malachi's Shape
	

The shape below can be classified as three of the following. Select the three names that can apply to the shape.

a. Pentagon
b. Parallelogram
c. Trapezoid
d. Rectangle
e. Quadrilateral
f. Square
g. Rhombus

Why can't a rhombus be part of the trapezoid family? Explain your thinking using the shapes below and a written statement.





A rhombus can't be part of the trapezoid family because it has two pair of parallel sides.

G3 U5 Lesson 6

Describe squares

G3 U5 Lesson 6 - Students will describe the attributes of squares

Tutor Notes: Students have been in the weeds of the parallelogram family with you for a few lessons so far, and today you will discuss the most specialized parallelogram, the square. A square is both a rectangle, as it has four right angles, and a rhombus, as it has four congruent sides. It is important for students to understand that a square is part of all of the prior "families" on the flow chart - it is a quadrilateral, parallelogram, rhombus, and a rectangle; but, it's most precise name is square because it has four congruent sides **and** four right angles.

Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): We have been learning all about different shapes within the parallelogram family, and today we are going to continue that learning by discussing the special attributes of a square.

Let's Review (Slide 3): We have been adding more shapes to our flowchart over the last few lessons together. In our last two lessons we discussed how rectangles and rhombuses are both part of the parallelogram family, but they have different attributes that put them into different subgroups.

Let's Review (Slide 4): Today we are going to learn about how a square is the most special parallelogram because it fits into every family that comes before it on the flowchart.

Let's Review (Slide 5): Before we get into today's lesson, I want to pause to make sure we remember some very important vocabulary words. These words are essential to our understanding of what makes a square unique from the other parallelograms we have discussed.

What does it mean if something is congruent?

- They are the same length.
- They have the same measurements.
- They are exactly the same size.

What is a right angle?

- An angle that measures 90 degrees.
- An angle that makes a perfect capital L.

That's right, if two things are **congruent** it means that they are the exact same. Sides and angles can be congruent. Yesterday, we learned that the rhombus has 4 congruent sides, 4 sides that are all the same length. And a right angle is a 90 degree angle that makes a perfect L, although the L might be facing a different way.

Let's Talk (Slide 6): Here we have some examples of some real life objects. Some are examples of squares, some are not. **What do you think makes squares special? What do you notice about the objects sorted on the slide?** Possible Student Answers, Key Points:

- The squares all have four right angles.
- The squares all have congruent sides.
- The square tiles are different from the other tiles because they have right angles and the other tiles don't.
- The kite doesn't have right angles, and the squares do.
- The garden doesn't have four congruent sides the way the squares do.

Let's Talk (Slide 7): As we saw in our flowchart and you started to notice with those objects, a square is the most special type of parallelogram because it has the most attributes. It's a quadrilateral with four sides, it's a parallelogram with two pairs of parallel sides, it's a rectangle with four right angles, and it's a rhombus with four congruent sides. All four of those attributes have to be true for us to call something a square.

Let's Think (Slide 8): Let's see if we can reason through the difference between a rectangle and a square. Let's consider side lengths and angles to see if we can determine how rectangles and squares are different.
What do you notice is different? Possible Student Answers, Key Points:

- The square has four congruent sides, but the rectangle only has opposite congruent sides.
- They're different colors.
- The rectangle is long but the square isn't.
- They both have 4 right angles.

That's right, a square is a special kind of rectangle because it has 4 right angles but it ALSO has 4 congruent sides.

Let's Think (Slide 9): Let's see if we can reason through the difference between a rhombus and a square. Let's consider side lengths and angles to see if we can determine how rhombuses and squares are different.
What do you notice is different? Possible Student Answers, Key Points:

- The square has to have four right angles, but the rhombus has acute and obtuse angles.
- The square has four right angles, but the rhombus has opposite congruent angles.
- The rhombus is thinner than the square.
- They both have 2 sets of parallel sides.

That's right, a square is a special type of rhombus because like a rhombus it has 4 congruent sides and 2 sets of parallel sides but it's super special because it ALSO has…4 right angles!

It's important to remember all of our shape attributes when we're describing shapes. We can be specific about the type of sides shapes have–whether they're parallel or congruent and we can be specific about the types of angles shapes have–whether they have right angles, obtuse angles, or acute angles.

Let's Try it (Slide 10): We are going to practice identifying, describing, and drawing squares and other types of quadrilaterals. Remember today we discussed how squares have four congruent sides and four right angles, making them a special subgroup of parallelograms.

WARM WELCOME

Today we will describe the attributes of squares.

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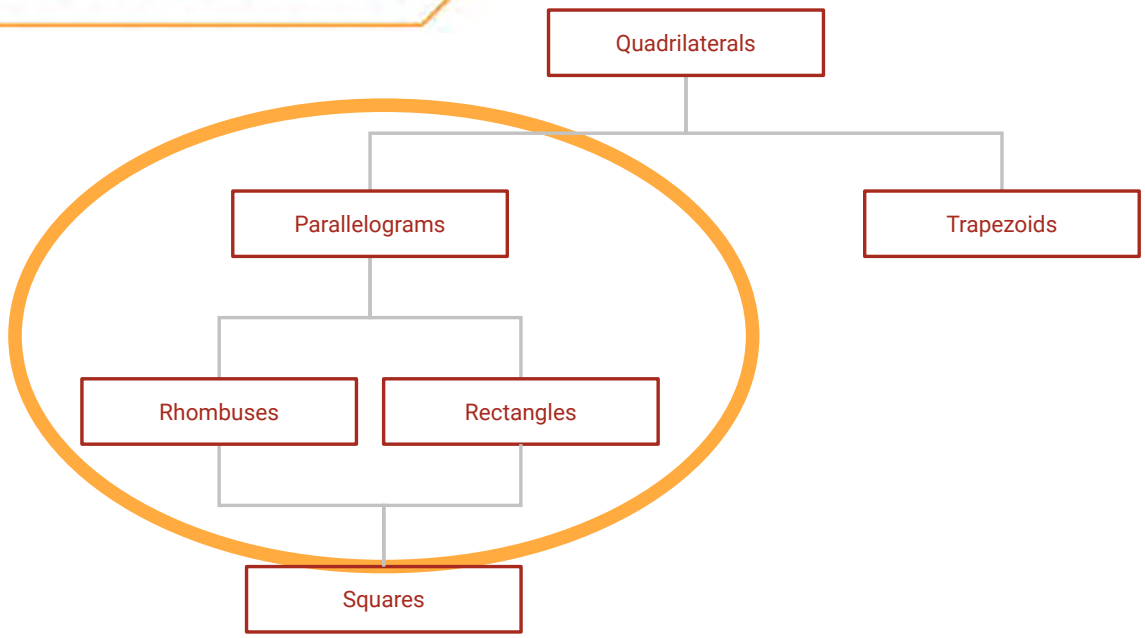
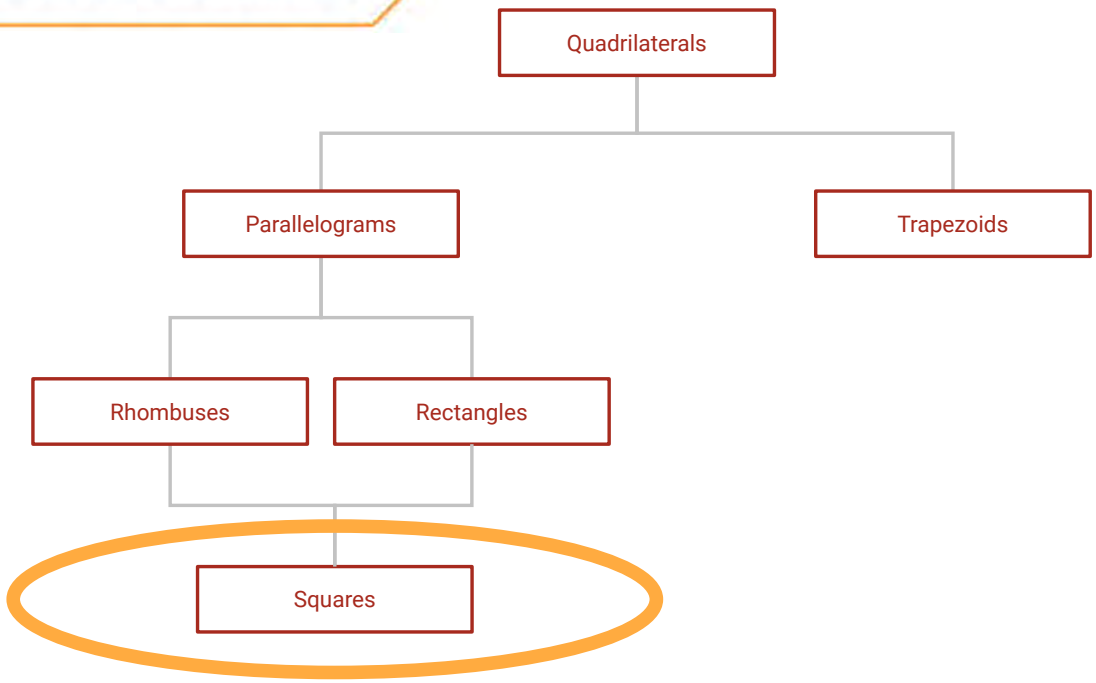
Let's Review:



Let's Review:



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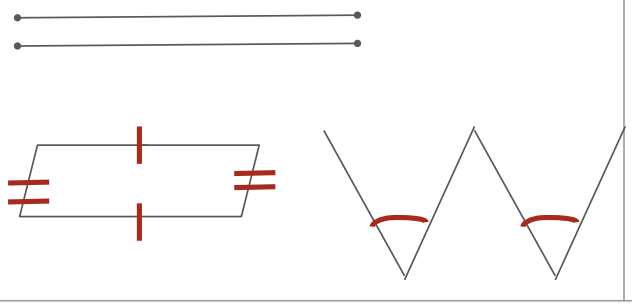
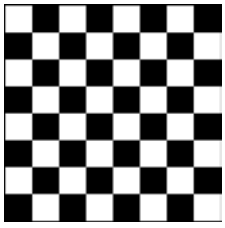
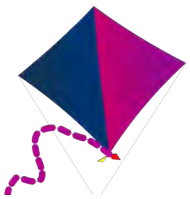
Let's Review:

Key Vocabulary

Congruent	Right Angle
	

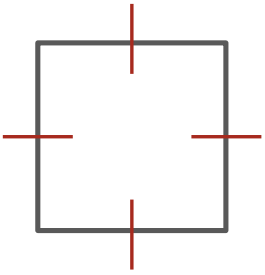
Let's Talk:

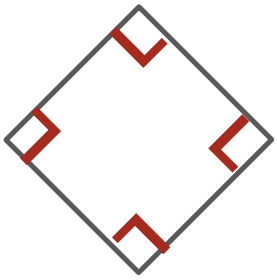
What makes a square special?

Squares	Non-squares
 chess board  pool  floor tiles	garden  floor tiles  kite 

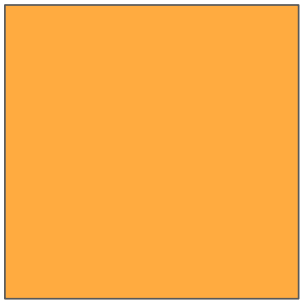
Let's Talk: What makes a square special?

- A square **is a rectangle** because it has four right angles.
- A square **is a rhombus** because it has four congruent sides.

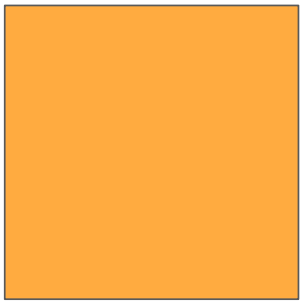
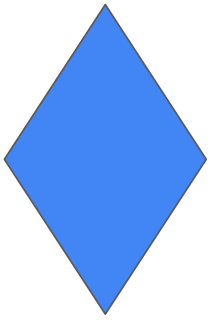




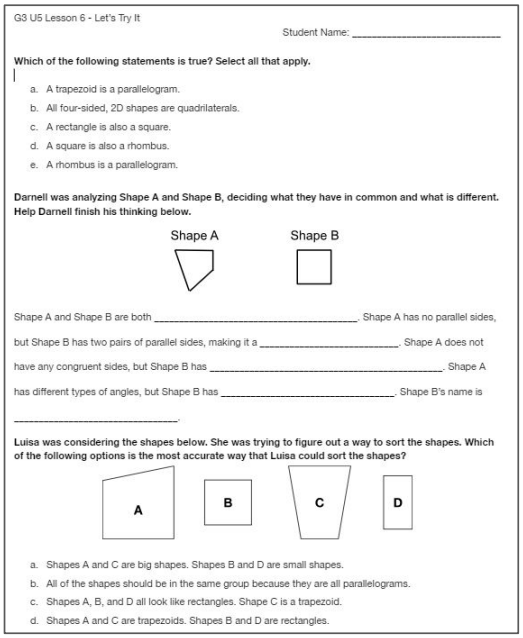
Let's Think: What's the difference?

Square	Rectangle
	

Let's Think: What's the difference?

Square	Rhombus
	

Let's Try It: Let's apply our understanding together.



G3 U5 Lesson 6 - Let's Try It

Student Name: _____

Which of the following statements is true? Select all that apply.

a. A trapezoid is a parallelogram.
b. All four-sided, 2D shapes are quadrilaterals.
c. A rectangle is also a square.
d. A square is also a rhombus.
e. A rhombus is a parallelogram.

Darnell was analyzing Shape A and Shape B, deciding what they have in common and what is different. Help Darnell finish his thinking below.

Shape A Shape B

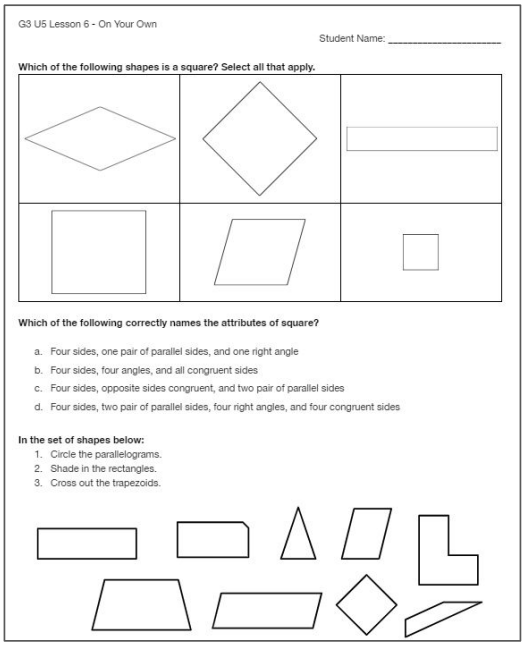
Shape A and Shape B are both _____. Shape A has no parallel sides, but Shape B has two pairs of parallel sides, making it a _____. Shape A does not have any congruent sides, but Shape B has _____. Shape A has different types of angles, but Shape B has _____. Shape B's name is _____.

Luisa was considering the shapes below. She was trying to figure out a way to sort the shapes. Which of the following options is the most accurate way that Luisa could sort the shapes?

A B C D

a. Shapes A and C are big shapes. Shapes B and D are small shapes.
b. All of the shapes should be in the same group because they are all parallelograms.
c. Shapes A, B, and D all look like rectangles. Shape C is a trapezoid.
d. Shapes A and C are trapezoids. Shapes B and D are rectangles.

On your Own: Let’s try on our own.



G3 U5 Lesson 6 - On Your Own

Student Name: _____

Which of the following shapes is a square? Select all that apply.

Which of the following correctly names the attributes of square?

a. Four sides, one pair of parallel sides, and one right angle
b. Four sides, four angles, and all congruent sides
c. Four sides, opposite sides congruent, and two pair of parallel sides
d. Four sides, two pair of parallel sides, four right angles, and four congruent sides

In the set of shapes below:

1. Circle the parallelograms.
2. Shade in the rectangles.
3. Cross out the trapezoids.

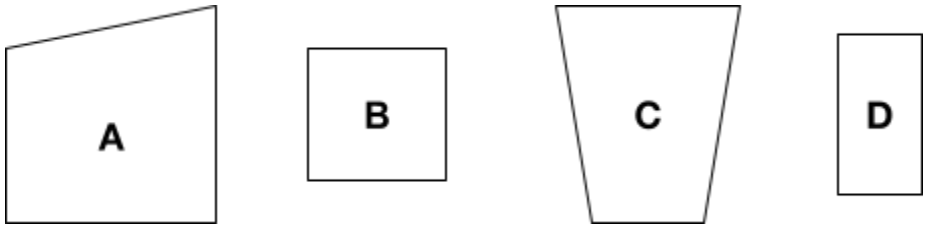
Which of the following statements is true? Select all that apply.

a. A trapezoid is a parallelogram.
b. All four-sided, 2D shapes are quadrilaterals.
c. A rectangle is also a square.
d. A square is also a rhombus.
e. A rhombus is a parallelogram.

Darnell was analyzing Shape A and Shape B, deciding what they have in common and what is different. Help Darnell finish his thinking below.

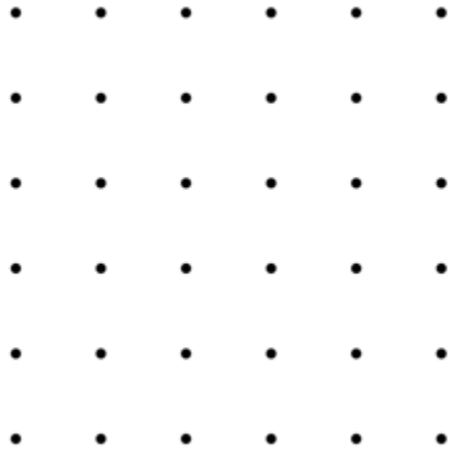
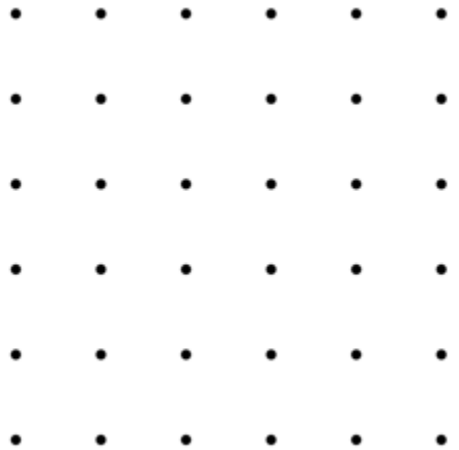
Shape A and Shape B are both _____. Shape A has no parallel sides, but Shape B has two pairs of parallel sides, making it a _____. Shape A does not have any congruent sides, but Shape B has _____. Shape A has different types of angles, but Shape B has _____. Shape B's name is _____.

Luisa was considering the shapes below. She was trying to figure out a way to sort the shapes. Which of the following options is the most accurate way that Luisa could sort the shapes?

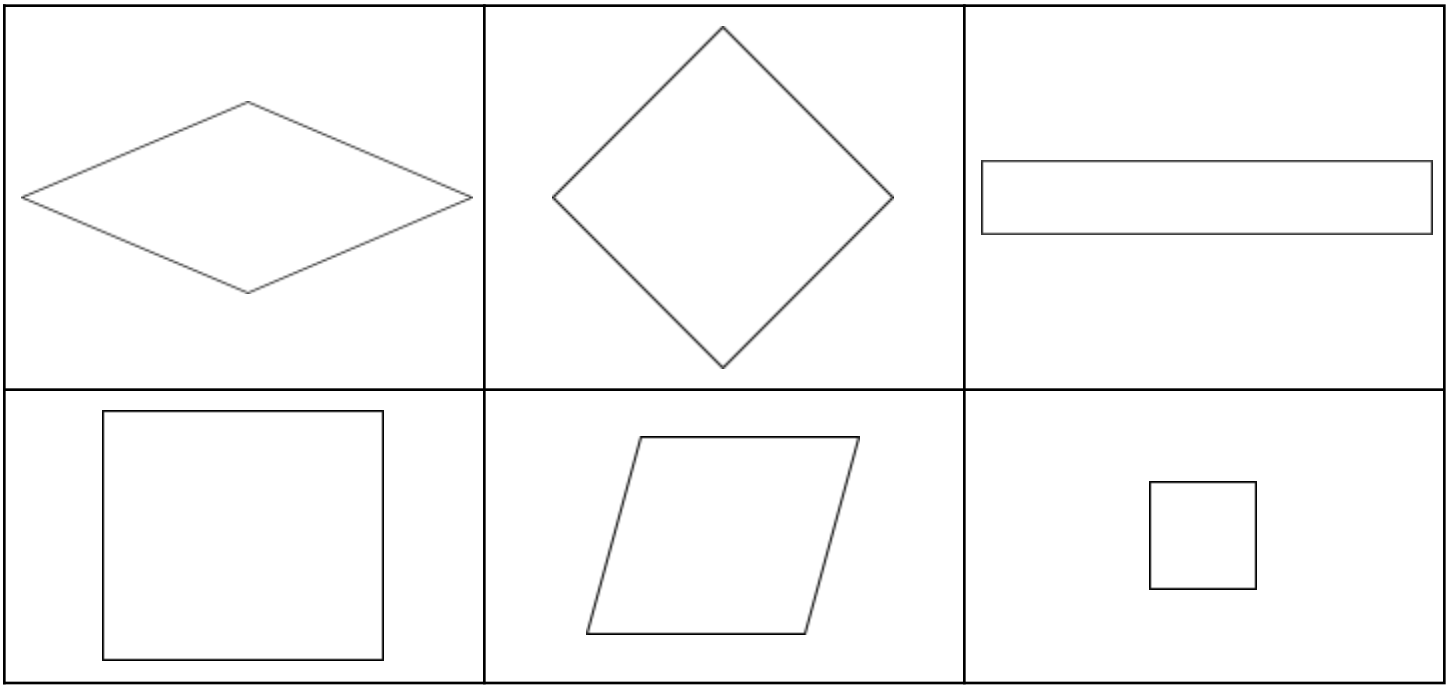


a. Shapes A and C are big shapes. Shapes B and D are small shapes.
b. All of the shapes should be in the same group because they are all parallelograms.
c. Shapes A, B, and D all look like rectangles. Shape C is a trapezoid.
d. Shapes A and C are trapezoids. Shapes B and D are rectangles.

Quadrilateral Riddles - Below are some quadrilateral riddles that describe the attributes of a quadrilateral. Use your knowledge of the attributes to name and draw the quadrilateral the riddle is talking about.

Riddle 1 ● I am a quadrilateral and a parallelogram. ● I have four right angles. ● I have four congruent sides. ● Who am I? _____	**Riddle 2** ● I am a quadrilateral and a parallelogram. ● My opposite angles are congruent. ● I have four congruent sides. ● Who am I? _____
	
Riddle 3 ● I am a quadrilateral. ● I have one pair of parallel sides. ● Who am I? _____	**Riddle 4** ● I am a quadrilateral and a parallelogram. ● I have four right angles. ● My opposite sides are congruent. ● Who am I? _____
	

Which of the following shapes is a square? Select all that apply.



Which of the following correctly names the attributes of square?

a. Four sides, one pair of parallel sides, and one right angle

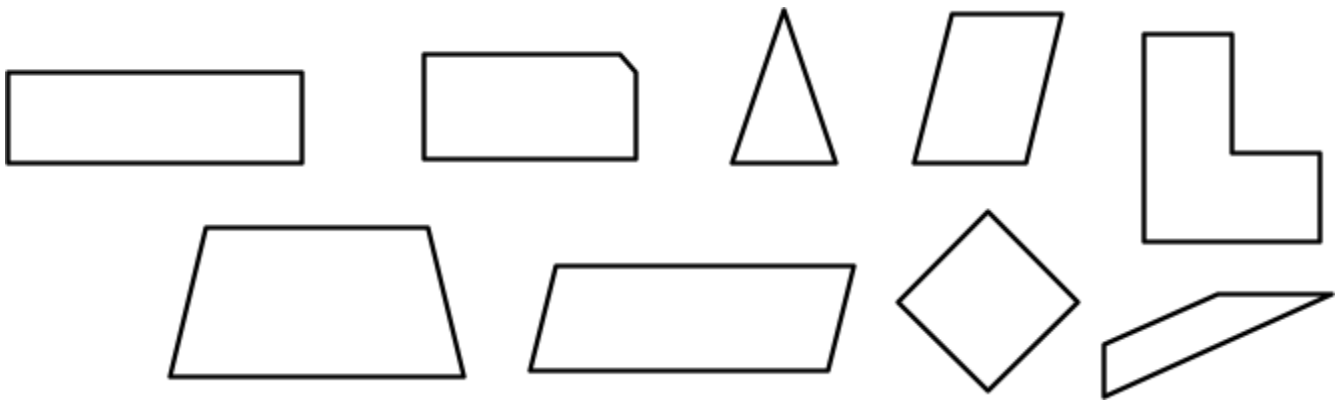
b. Four sides, four angles, and all congruent sides

c. Four sides, opposite sides congruent, and two pair of parallel sides

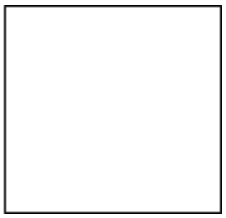
d. Four sides, two pair of parallel sides, four right angles, and four congruent sides

In the set of shapes below:

1. Circle the parallelograms.
2. Shade in the rectangles.
3. Cross out the trapezoids.



How are a rectangle and a square the same? How are they different?



A rectangle and a square are the same because…

1.

2.

3.

A rectangle and a square are different because _____

_____

_____

Which of the following statements is true? Select all that apply.

a. A trapezoid is a parallelogram.
b. All four-sided, 2D shapes are quadrilaterals.
c. A rectangle is also a square.
d. A square is also a rhombus.
e. A rhombus is a parallelogram.

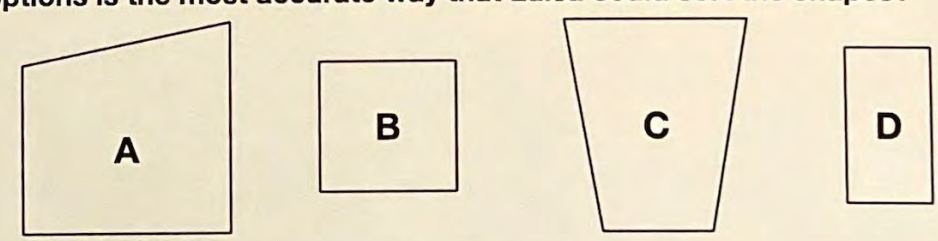
Darnell was analyzing Shape A and Shape B, deciding what they have in common and what is different. Help Darnell finish his thinking below.

Shape A

Shape B

Shape A and Shape B are both quadrilaterals. Shape A has no parallel sides, but Shape B has two pairs of parallel sides, making it a parallelogram. Shape A does not have any congruent sides, but Shape B has all congruent sides. Shape A has different types of angles, but Shape B has all right angles. Shape B's name is Square.

Luisa was considering the shapes below. She was trying to figure out a way to sort the shapes. Which of the following options is the most accurate way that Luisa could sort the shapes?

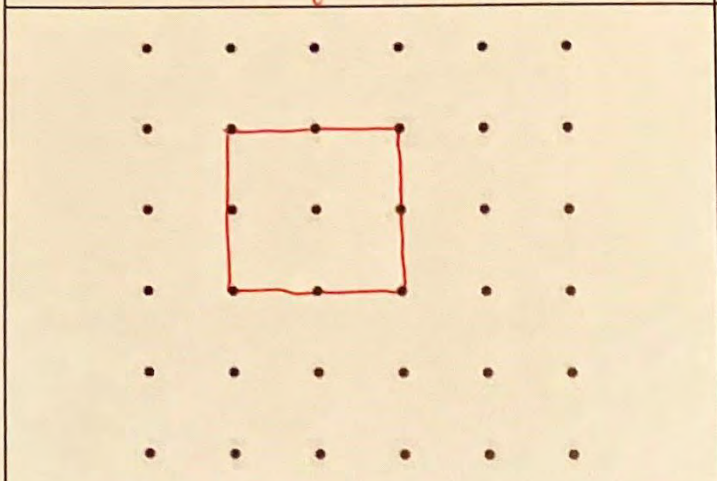


a. Shapes A and C are big shapes. Shapes B and D are small shapes.
b. All of the shapes should be in the same group because they are all parallelograms.
c. Shapes A, B, and D all look like rectangles. Shape C is a trapezoid.
d. Shapes A and C are trapezoids. Shapes B and D are rectangles.

Quadrilateral Riddles - Below are some quadrilateral riddles that describe the attributes of a quadrilateral. Use your knowledge of the attributes to name and draw the quadrilateral the riddle is talking about.

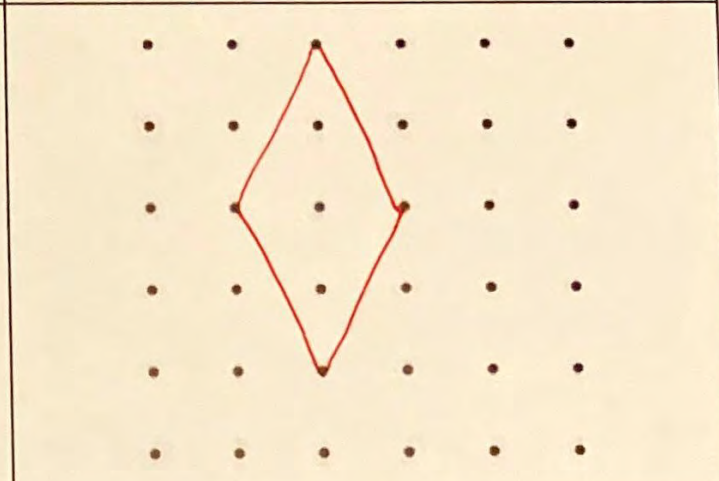
Riddle 1

- I am a quadrilateral and a parallelogram.
- I have four right angles.
- I have four congruent sides.
- Who am I? square



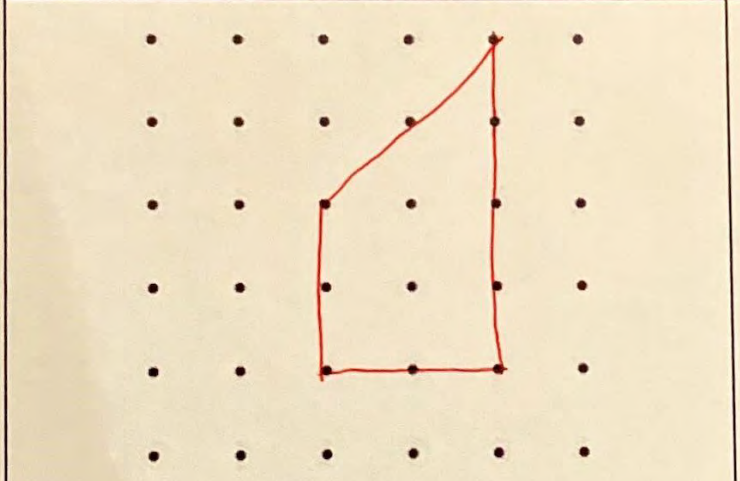
Riddle 2

- I am a quadrilateral and a parallelogram.
- My opposite angles are congruent.
- I have four congruent sides.
- Who am I? rhombus



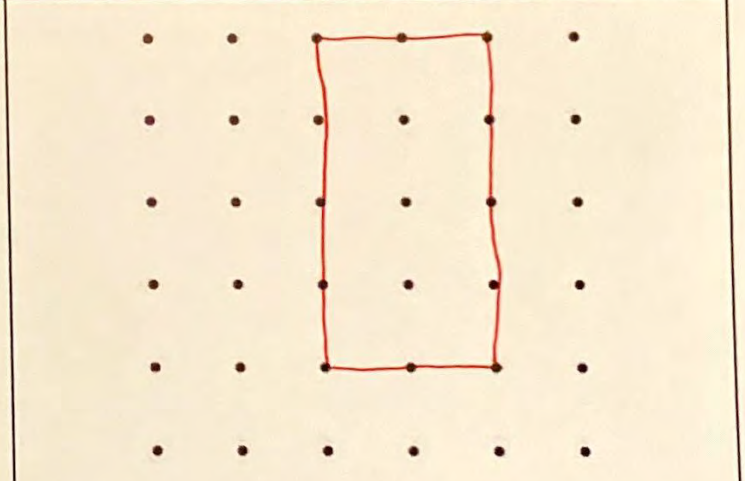
Riddle 3

- I am a quadrilateral.
- I have one pair of parallel sides.
- Who am I? trapezoid



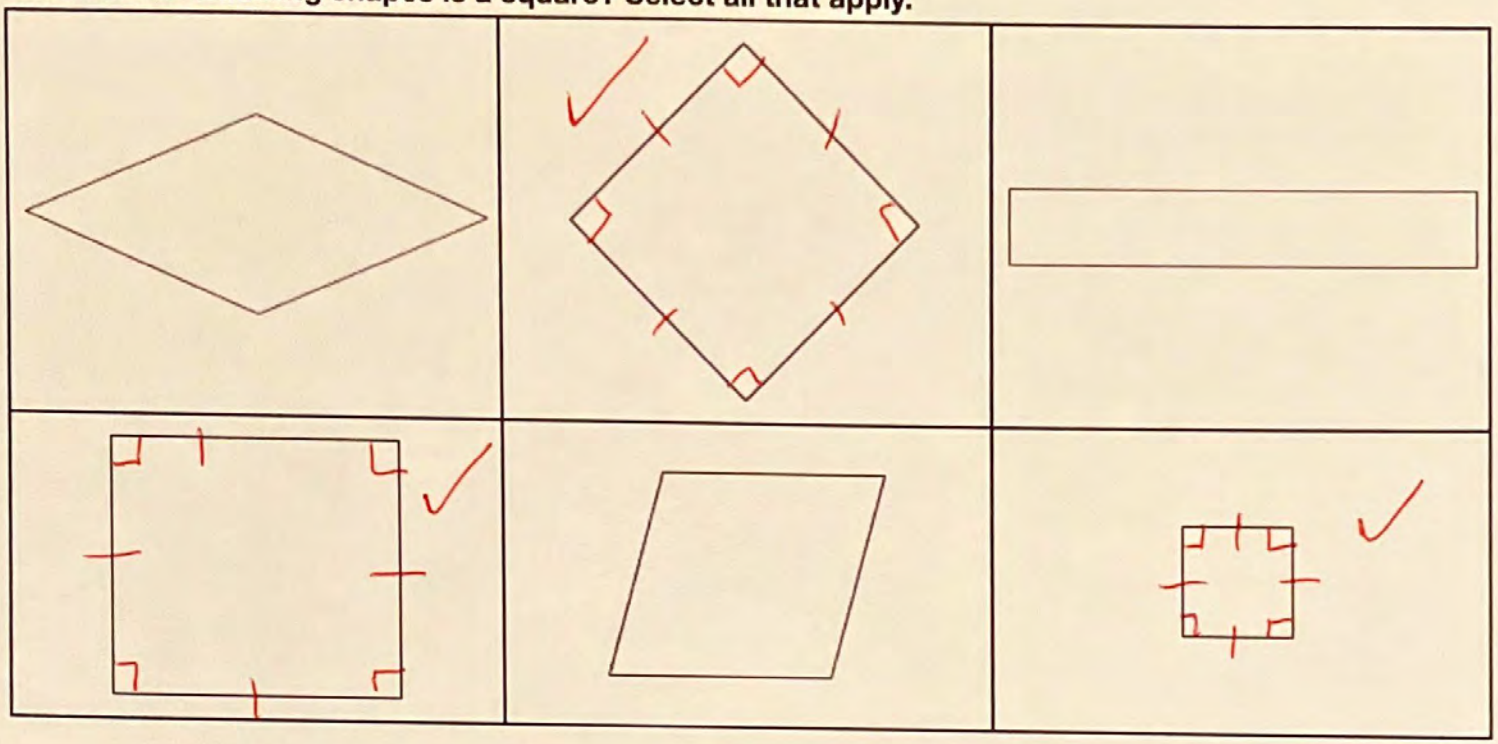
Riddle 4

- I am a quadrilateral and a parallelogram.
- I have four right angles.
- My opposite sides are congruent.
- Who am I? rectangle



Student Name: Answer Key

Which of the following shapes is a square? Select all that apply.



Which of the following correctly names the attributes of square?

a. Four sides, one pair of parallel sides, and one right angle

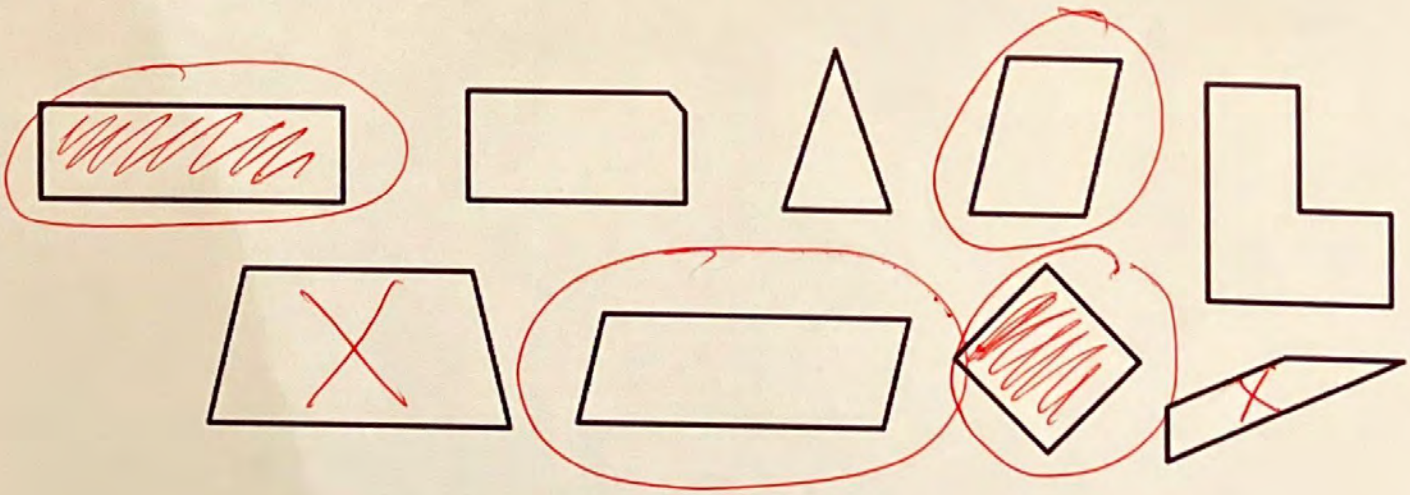
b. Four sides, four angles, and all congruent sides

c. Four sides, opposite sides congruent, and two pair of parallel sides

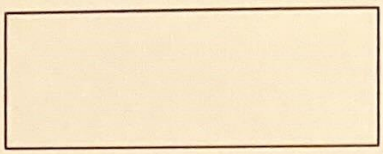
d. Four sides, two pair of parallel sides, four right angles, and four congruent sides

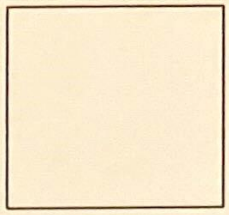
In the set of shapes below:

1. Circle the parallelograms.
2. Shade in the rectangles.
3. Cross out the trapezoids.



How are a rectangle and a square the same? How are they different?





A rectangle and a square are the same because...

1. They are both quadrilaterals.
2. They are both parallelograms.
3. They both have 4 right angles.

A rectangle and a square are different because a square has all sides congruent, but a rectangle has opposite sides congruent.

G3 U5 Lesson 7

Compare and classify polygons

G3 U5 Lesson 7 - Students will compare and classify other types of polygons

Tutor Notes: Up to this point students have been primarily focused on understanding the family of quadrilaterals and the attributes that make shapes within that family distinct from one another. In today's lesson, you will be taking a broader look at other types of shapes/polygons. The term polygon may be unfamiliar to students. Polygons are closed figures with straight sides and no sides that cross. Students begin learning the names of polygons in Kindergarten including triangle, square, rectangle, and hexagon. They add to that learning in second grade by learning quadrilaterals and pentagons. In third grade, their skill set progresses to focus on being able to identify attributes that shapes share, being able to categorize shapes, and being able to provide examples and non-examples of given shapes. For reference, some of these concepts were addressed in Lesson 1 in this unit as well.

Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): We spent a number of lessons together working on understanding all of the attributes of shapes within the quadrilateral family. Today we are going to practice a bit with shapes that are not in the quadrilateral family like triangles, pentagons, and hexagons.

Let's Review (Slide 3): We have learned about a number of different attributes that we can use to describe and classify shapes. **What are some of the attributes we can use to describe shapes? Use the shapes on the slide as examples.** Possible Student Answers, Key Points:

- Number of sides
- Number of angles
- Types of angles
- Congruent sides
- Right angles, acute angles, obtuse angles
- Parallel sides

Let's Review (Slide 4): Great job remembering so many of the attributes we've been learning about! We can describe, classify, and compare shapes by thinking about their sides - how many there are and if any of them are congruent in addition to their angles - how many there are and what types of angles the shape has.

Let's Talk (Slide 5): Today we are going to talk about a few different types of polygons. That may be an unfamiliar word for you, but let's see if we can start to figure out what a polygon is by looking at the polygons and non-polygons on the slide. **How might we describe a polygon to someone based on what we are seeing?** Possible Student Answers, Key Points:

- A polygon has all straight sides.
- A polygon does not have sides that cross or intersect.
- A polygon is closed.

Note: Students may not yet have accurate vocabulary to express what they are noticing such as intersect or closed figure. If students struggle to identify ways to describe the polygon, consider referring to the non-polygon examples first and prompt the student to think about what a polygon can't be. For example, referring to the half circle, "Take a look at this shape. What do you notice about this shape that may help us understand what a polygon can't be?"

Let's Talk (Slide 6): I know it's tough to look at a few images and try to figure out what the rules are, but you did a great job reasoning through that! Polygons are just closed shapes with straight sides and lines that do not cross, like all of the shapes we've been looking at! All of the blue shapes have straight sides and lines that don't cross. They're also all closed, like a fence! And the orange shapes AREN'T polygons because they either have curved sides, or line that cross or they're open figures.

Let's Think (Slide 7): We have a pretty interesting group of polygons here. They all look pretty different from each other, but we have to find something that is in common. **How might we start trying to figure out what they all have in common?** Count the sides. Count the angles.

Great! Let's test out counting the sides and angles and see what we find. *(Mark each side as you count and circle each angle as you count. Encourage the student to take over after you model the first shape.)* You did a great job working through each shape. So what did you notice about this group of polygons? They all have six sides. They all have six angles. They are all hexagons.

Way to go! So you determined that all of the shapes on this slide have six sides and six angles, making them all hexagons. Let's see if you can do the same thing with the next set of polygons.

Let's Think (Slide 8): Take a look at this set of polygons. Work through them the same way we just practiced together and see if you can determine what they all have in common. They all have five sides. They all have five angles. They are all pentagons.

Great job noticing that all the shapes have five sides and five angles. This makes all of these polygons, pentagons.

Let's Think (Slide 9): This chart is a reminder of the other types of polygons we talked about way back in lesson 1. It's important to understand the attributes of each group. Triangles have three sides and three angles, quadrilaterals have four sides and four angles–and lots of other names too, pentagons have five sides and five angles, and hexagons have six sides and six angles. The shapes within each group can look very different from each other as long as they have those attributes.

Let's Think (Slide 10): Let's see if we can apply our understanding about these polygons and their attributes to being able to compare and contrast a set of shapes. Look at the shapes on the slide. **What is the same about the shapes? What is different about the shapes?** Possible Student Answers, Key Points:

- They are both triangles. They both have three sides and three angles.
- One of the triangles has a right angle and the other triangle only has acute and obtuse angles.
- One of the triangles has two congruent sides, but the other triangle has all sides congruent.

Let's Think (Slide 11): Let's try one more set before we jump into our practice. **Look at the shapes on the slide. What is the same about the shapes? What is different about the shapes?** Possible Student Answers, Key Points:

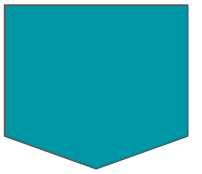
- They are both hexagons. They both have six sides and six angles.
- One of the hexagons has all right angles and the other doesn't have any right angles.
- One of the hexagons has all congruent sides and the other doesn't have any congruent sides.

Let's Try it (Slide 12): We are going to practice together identifying polygons. Remember that polygons are closed figures with straight sides and no lines that cross. We will also practice being able to compare and classify polygons other than quadrilaterals by considering their attributes.

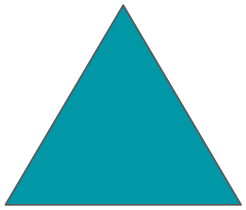
WARM WELCOME

Today we will compare and classify other types of polygons.

Let's Review:



What attributes do we use to describe and classify shapes?


Let's Review:

What attributes do we use to describe and classify shapes?

- Number of sides
- Number of angles
- Types of angles
- Congruent sides
- Parallel sides

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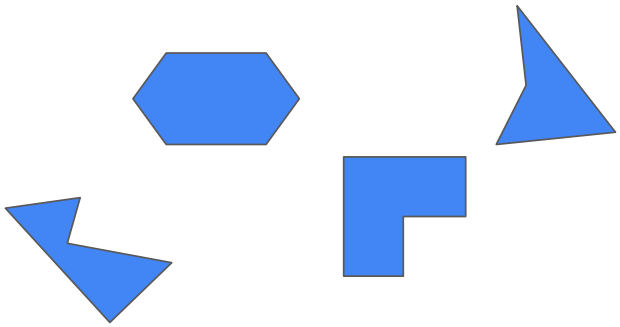
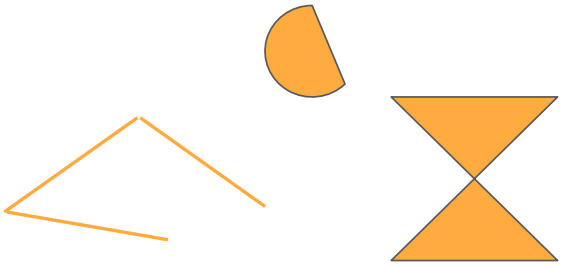
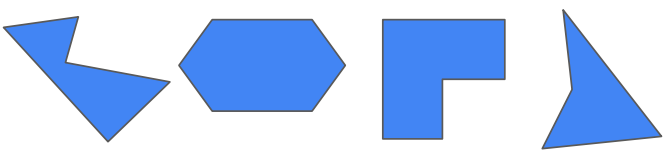
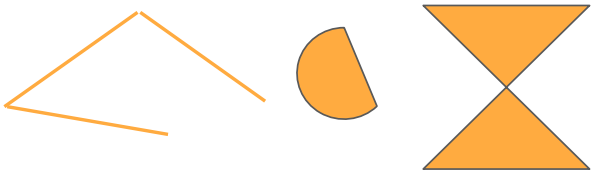
Let's Talk: What is a polygon?

Polygon	Non-polygons
	

Let's Talk: What is a polygon?

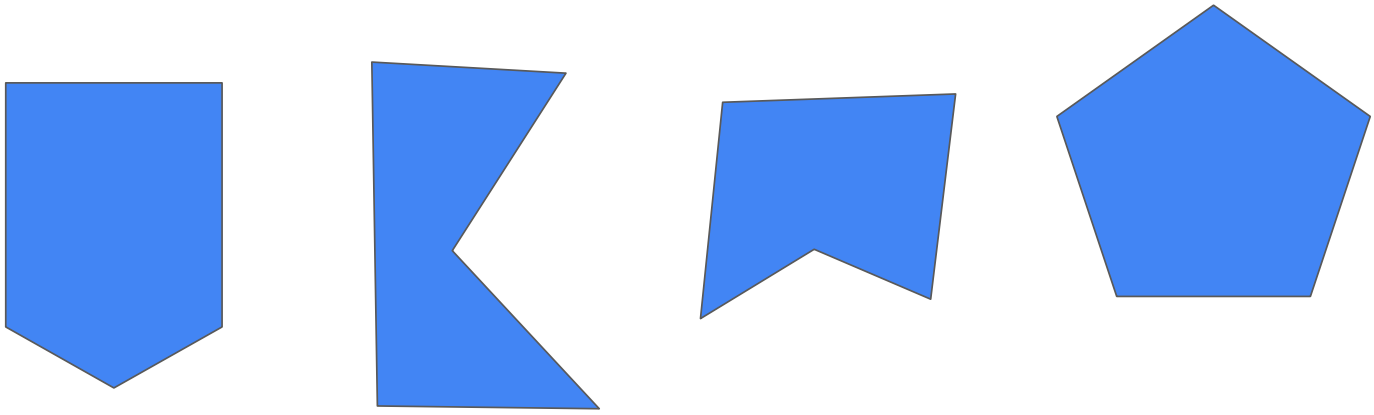
Polygon	Non-polygons
	
Closed **Straight sides** **No sides that cross**	**Open** **Curved sides** **Sides that cross**

Let's Think:

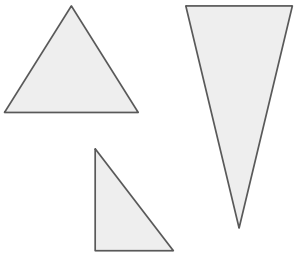
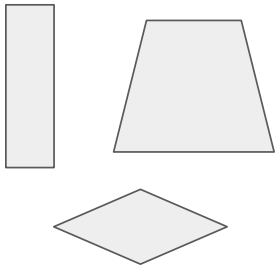
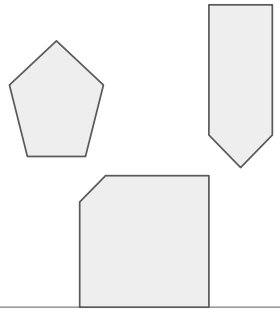
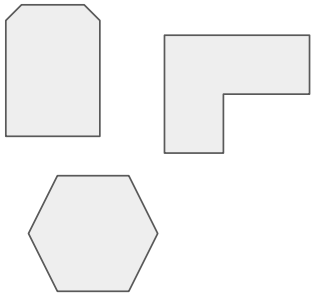
What do you notice is the same about all of these shapes?

Let's Think:

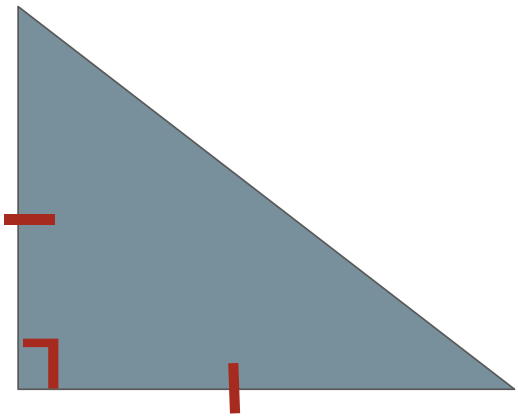
What do you notice is the same about all of these shapes?

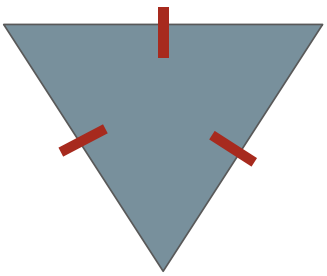


Let's Think:

Triangles	Quadrilaterals	Pentagons	Hexagons
3 sides 3 angles	4 sides 4 angles	5 sides 5 angles	6 sides 6 angles
			

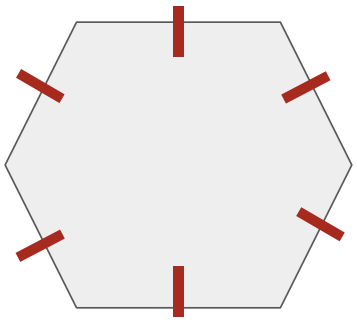
Let's Think: What is the same? What is different?





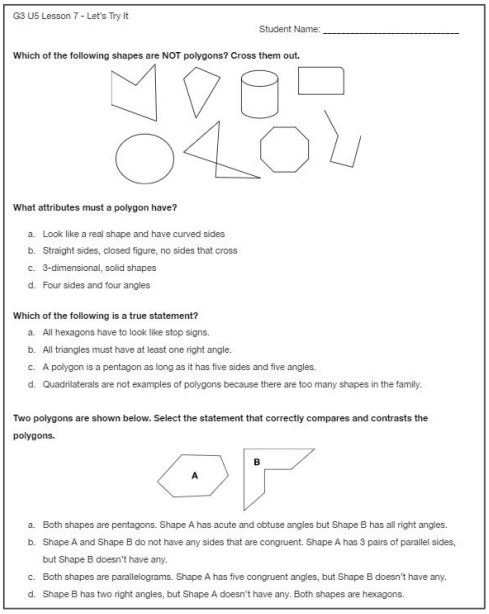
Let's Think:

What is the same? What is different?



Let's Try It:

Let's apply our understanding together.



G3 U5 Lesson 7 - Let's Try It

Student Name: _____

Which of the following shapes are NOT polygons? Cross them out.

What attributes must a polygon have?

a. Look like a real shape and have curved sides
b. Straight sides, closed figure, no sides that cross
c. 3-dimensional, solid shapes
d. Four sides and four angles

Which of the following is a true statement?

a. All hexagons have to look like stop signs.
b. All triangles must have at least one right angle.
c. A polygon is a pentagon as long as it has five sides and five angles.
d. Quadrilaterals are not examples of polygons because there are too many shapes in the family.

Two polygons are shown below. Select the statement that correctly compares and contrasts the polygons.

A B

a. Both shapes are pentagons. Shape A has acute and obtuse angles but Shape B has all right angles.
b. Shape A and Shape B do not have any sides that are congruent. Shape A has 3 pairs of parallel sides, but Shape B doesn't have any.
c. Both shapes are parallelograms. Shape A has five congruent angles, but Shape B doesn't have any.
d. Shape B has two right angles, but Shape A doesn't have any. Both shapes are hexagons.

On your Own: Let’s try on our own.

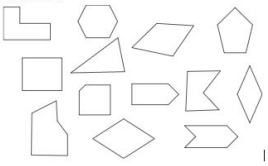
G3 U5 Lesson 7 - On Your Own

Student Name: _____

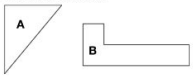
Select all of the names that can be correctly used for the shape below.

a. Polygon
b. Quadrilateral
c. Trapezoid
d. Pentagon
e. Rectangle

Austin just got a new set of magnet tiles. He is sorting out all of the tiles that are hexagons. Shade in the tiles that Austin should sort out.



Two shapes are pictured below. Compare and contrast the shapes. Provide at least one attribute that is the same and at least one attribute that is different.



_____

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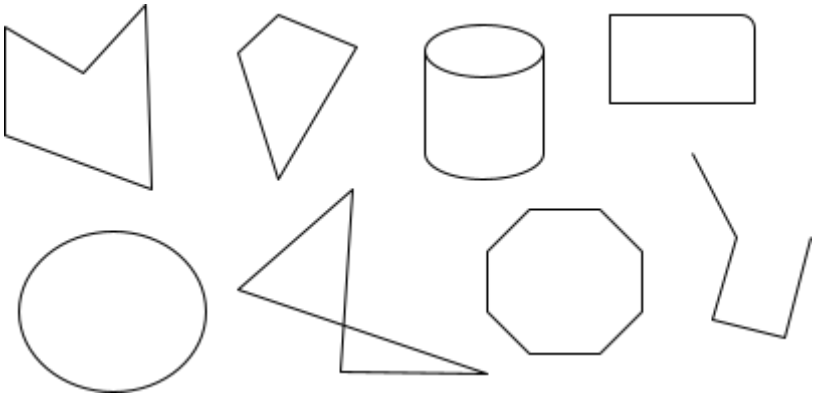
_____

Which of the following shapes are NOT polygons? Cross them out.



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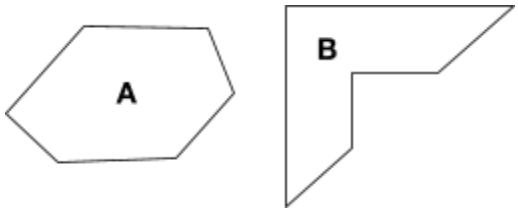

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c. Both shapes are parallelograms. Shape A has five congruent angles, but Shape B doesn't have any.
d. Shape B has two right angles, but Shape A doesn't have any. Both shapes are hexagons.

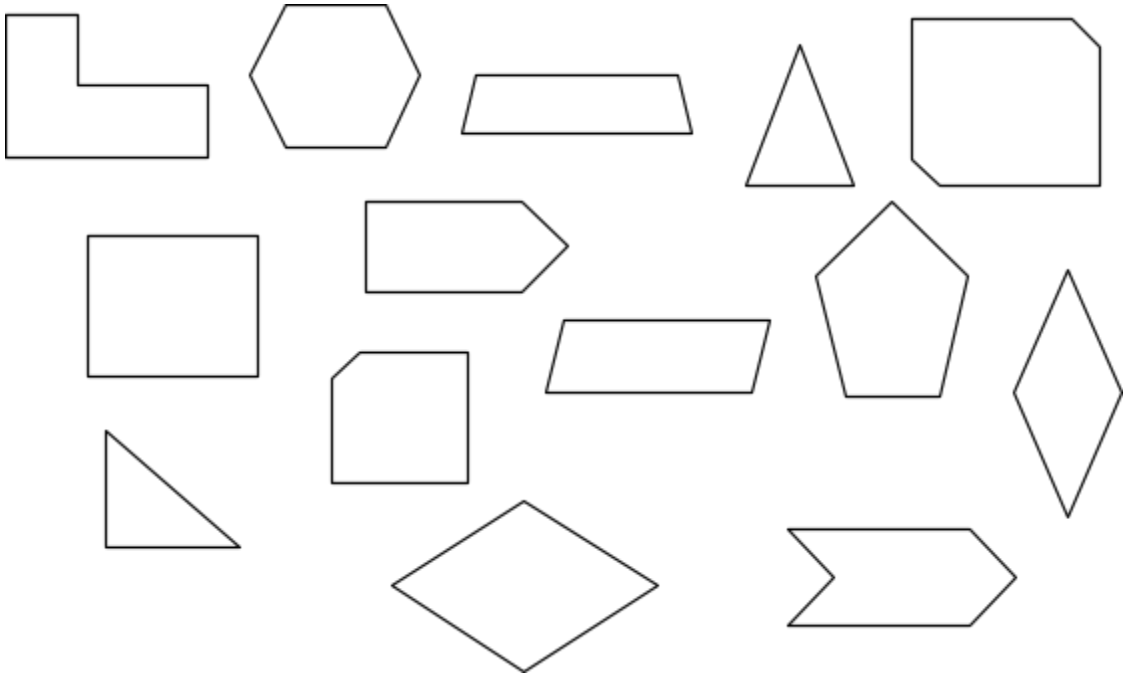
Cherish was describing a polygon to her partner. Draw a polygon to match Cherish's description. (Hint: there is more than one correct way to draw Cherish's polygon.)

- **It has five sides and five angles.**
- **Two of the angles are right angles.**

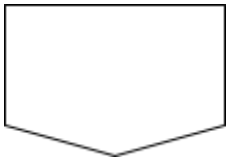
Look at the set of polygons below.

- **Mark all pentagons with the letter P.**
- **Mark all hexagons with the letter H.**

(Remember to show counting your sides and angles as proof.)



Select all of the names that can be correctly used for the shape below.



a. Polygon
b. Quadrilateral
c. Trapezoid
d. Pentagon
e. Rectangle

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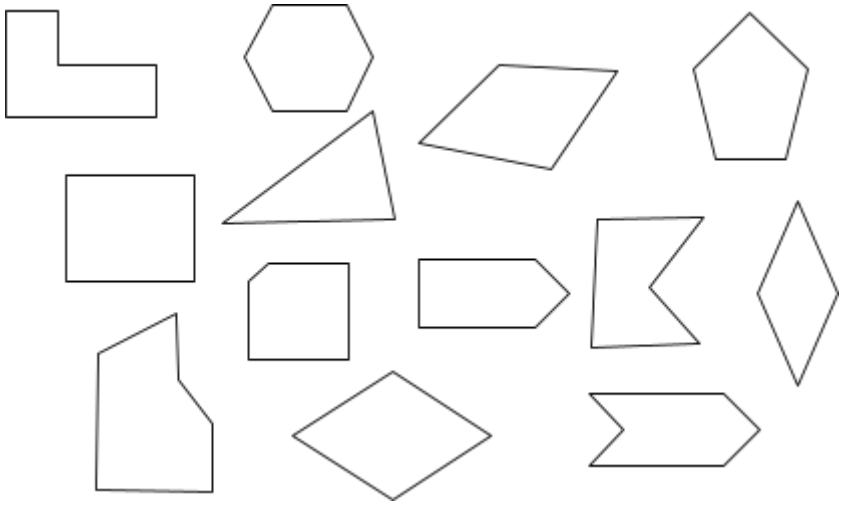
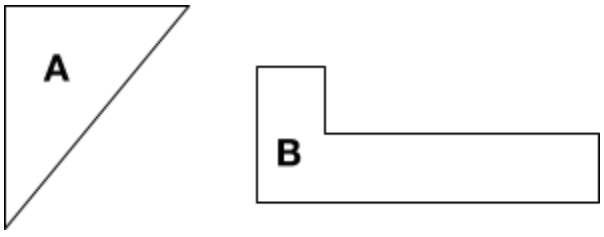


Two shapes are pictured below. Compare and contrast the shapes. Provide at least one attribute that is the same and at least one attribute that is different.



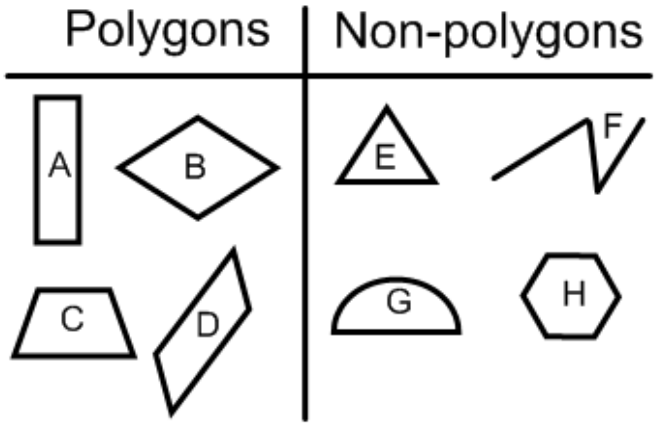
_____

_____

_____

_____

Melody's teacher asked her to make a chart and draw examples of polygons and non-polygons. Below is Melody's chart. Use her chart to answer the question below.



Melody's chart is incorrect. Which shapes are in the wrong category **and why**?

_____

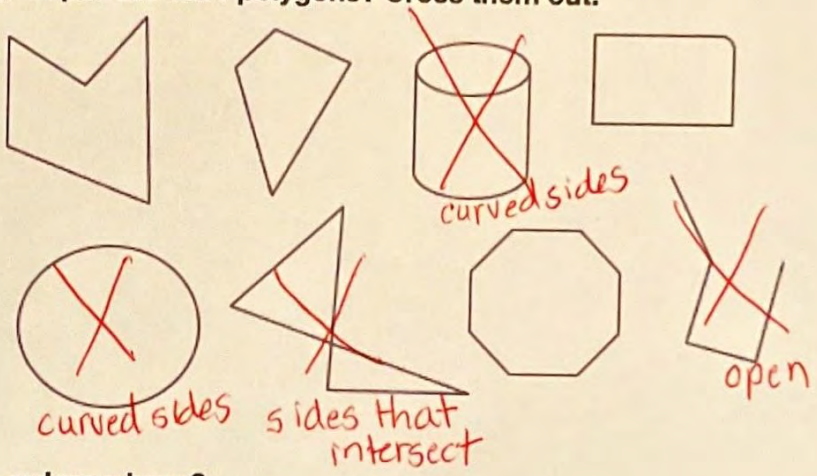
_____

_____

_____

Student Name: _____ G3 U5 Lesson 7 - Let's Try It

Which of the following shapes are NOT polygons? Cross them out.



What attributes must a polygon have?

a. Look like a real shape and have curved sides

b. Straight sides, closed figure, no sides that cross

c. 3-dimensional, solid shapes

d. Four sides and four angles

Which of the following is a true statement?

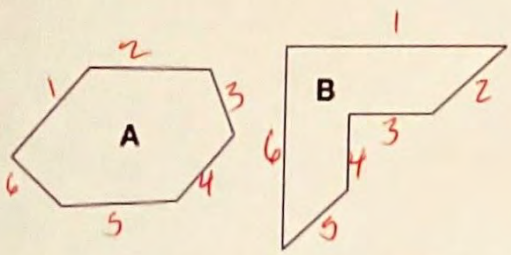
a. All hexagons have to look like stop signs.

b. All triangles must have at least one right angle.

c. A polygon is a pentagon as long as it has five sides and five angles.

d. Quadrilaterals are not examples of polygons because there are too many shapes in the family.

Two polygons are shown below. Select the statement that correctly compares and contrasts the polygons.



a. Both shapes are pentagons. Shape A has acute and obtuse angles but Shape B has all right angles.

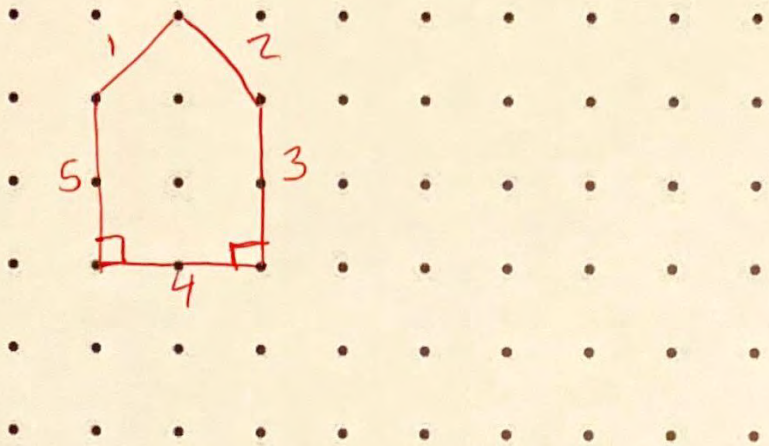
b. Shape A and Shape B do not have any sides that are congruent. Shape A has 3 pairs of parallel sides, but Shape B doesn't have any.

c. Both shapes are parallelograms. Shape A has five congruent angles, but Shape B doesn't have any.

d. Shape B has two right angles, but Shape A doesn't have any. Both shapes are hexagons.

Cherish was describing a polygon to her partner. Draw a polygon to match Cherish's description. (Hint: there is more than one correct way to draw Cherish's polygon.)

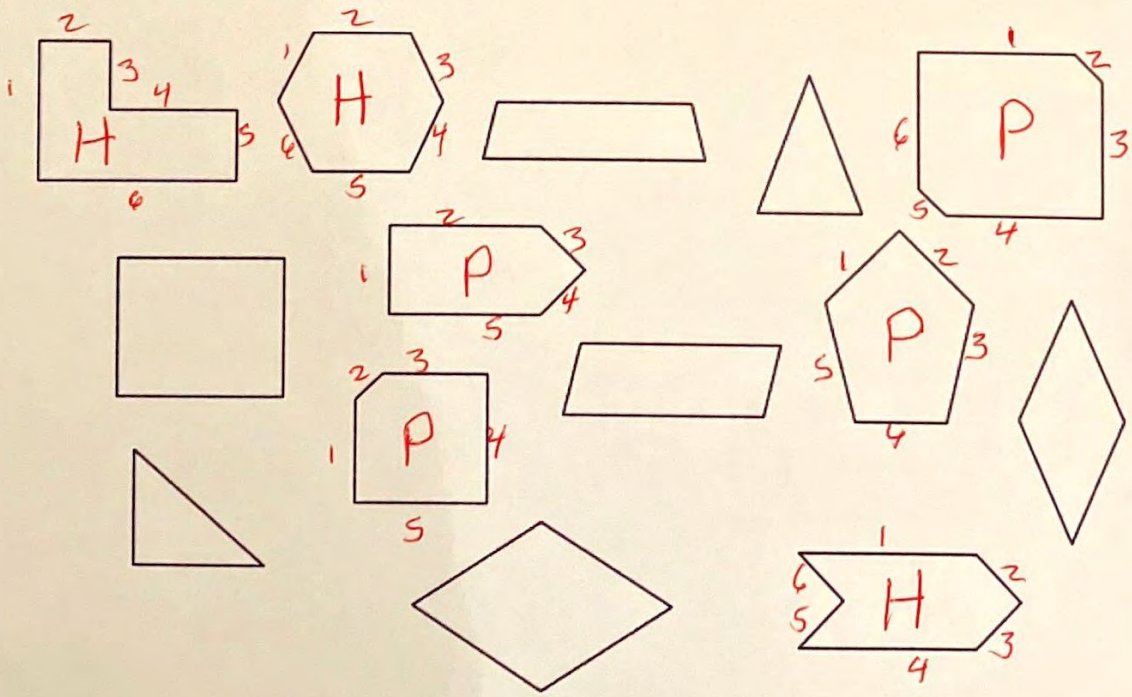
- **It has five sides and five angles.**
- **Two of the angles are right angles.**



Look at the set of polygons below.

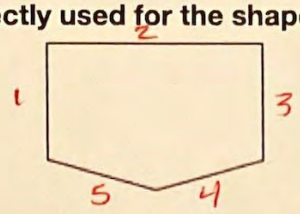
- **Mark all pentagons with the letter P.**
- **Mark all hexagons with the letter H.**

(Remember to show counting your sides and angles as proof.)



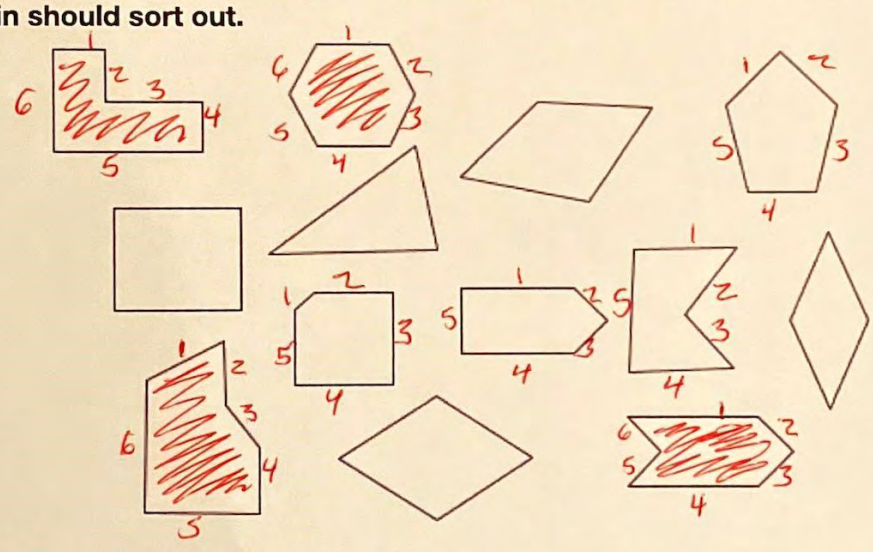
Student Name: Answer Key G3 U5 Lesson 7 - Independent Work

Select all of the names that can be correctly used for the shape below.

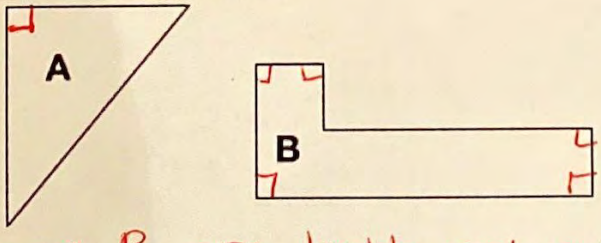


a. Polygon
b. Quadrilateral
c. Trapezoid
d. Pentagon
e. Rectangle

Austin just got a new set of magnet tiles. He is sorting out all of the tiles that are hexagons. Shade in the tiles that Austin should sort out.

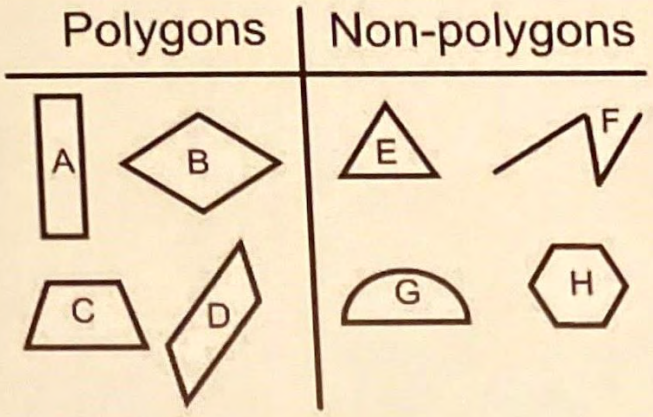


Two shapes are pictured below. Compare and contrast the shapes. Provide at least one attribute that is the same and at least one attribute that is different.



Shape A and Shape B are both polygons with at least one right angle. Shape A only has 3 sides and is a triangle, but Shape B has 6 sides and is a hexagon.

Melody's teacher asked her to make a chart and draw examples of polygons and non-polygons. Below is Melody's chart. Use her chart to answer the question below.



Melody's chart is incorrect. Which shapes are in the wrong category **and why**?

Shapes E and H are in the wrong category. They are closed figures with straight sides that do not cross, so they should be in the polygon group.

G3 U5 Lesson 8

Measure to find perimeter

CITYTUTOR

G3 U5 Lesson 8 - Students will measure side lengths of polygons to determine perimeter

Tutor Notes: The final three lessons of this unit will focus on applying some of the understandings of shape attributes to being able to determine the perimeter of given polygons. For example, if a student understands that a rhombus has four congruent sides, they will still be able to calculate the perimeter of the shape if given one side length. Perimeter is a new concept in the third grade. Students will have prior exposure to area, so they already should understand that area is the space inside a shape or what the shape covers. Perimeter is the distance around the shape, and we can determine perimeter by adding all of the side lengths together. Students should also understand real-world contexts for perimeter such as building a fence, picture frames, adding a border onto a project, or painting boundary lines on a field.

In Lesson 8, students will work primarily with determining side lengths by counting the square units on a grid and/or using a ruler to measure side lengths to the nearest inch.

Materials:

- Grid paper
- Printable rulers

Warm Welcome (Slide 1): Tutor choice

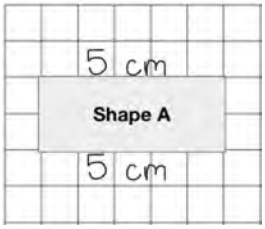
Frame the Learning/Connect to Prior Learning (Slide 2): We have spent a lot of lessons together learning about the attributes of polygons that we use to describe and classify them. Our understanding of some of those attributes, like congruent sides, is going to really help us with the next skill that we learn together, perimeter. You probably have already learned about area in your class or in an earlier tutoring unit, so you know that area is the space inside a shape, we can find the area of a rectangle or square by multiplying length times width. Perimeter is the distance around a shape and we find it by adding all of our side lengths together. We are going to spend the next few lessons working with perimeter, when we see it in the real world, and how to find it if we aren't given our side lengths.

Let's Review (Slide 3): Let's take a look at some of the polygons on the screen. We learned important attributes about these polygons in our previous lessons. Take a moment to think back about what we learned specifically about their congruent sides. When you're ready, remind me, **what did we learn about the congruent sides of Shape A? What is Shape A called?** Shape A is a rectangle. It has opposite sides congruent. The top and bottom are congruent and the two sides are congruent.

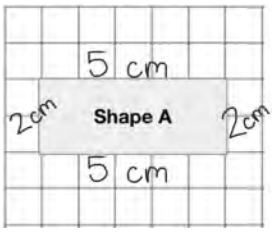
Great! How about Shape B? **What do we know about congruent sides in Shape B?** Shape B is a square. It has four congruent sides.

Awesome remembering! **What do you remember about congruent sides in Shape C?** Shape C is a rhombus. It also has four congruent sides. Excellent! So remembering those congruent sides in the shapes is going to help us out a lot when we are trying to find the perimeter of polygons.

Let's Think (Slide 4): Sometimes we may see polygons shown to us on a square grid to help us determine the side lengths. We already talked about side lengths when we were exploring area.



Let's look at the rectangle together. Let's find the length of the top of the rectangle first. We can count how many centimeters it is. Count with me…1, 2, 3, 4, 5 (*point and count*). *And,* what would the bottom side length be? The bottom is also 5 centimeters because I know the top and bottom of rectangles are congruent.



Okay, now let's find the length of the sides! Count with me…1, 2! So both sides of the rectangle are 2 cm, let's label them.

Nice! Now that we know all of our dimensions or side lengths, we are ready to find perimeter!

Perimeter is the distance around the OUTSIDE of a shape. For example, if I wanted to put a fence around this rectangle, I would have to measure around the outside (*trace finger around outside*). And, I find perimeter by adding all of the side lengths together, so what would my equation be to find perimeter? 5 + 5 + 2 + 2 or 5 + 2 + 5 + 2!

That's right, because we need to add all of the sides together (*point*). So, let's all take a moment to solve for the perimeter. When you have it, give me a thumbs up. The perimeter is 14 centimeters. Great job! I agree with you.

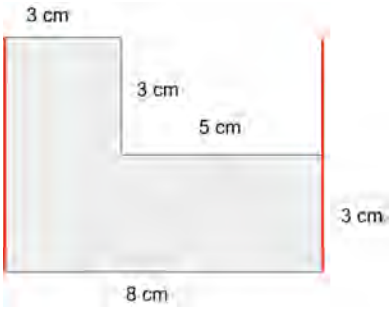
Let's Talk (Slide 5): Sometimes we will not be given a grid to help us figure out side lengths. Sometimes the lengths will be labeled for us, or sometimes we may even have to use a ruler to help us measure the lengths. Here, it looks like we have ONE side length and it's asking us to find the perimeter of the square. Hmmm, **how can we find the perimeter of the square?** Possible Student Answers, Key Points:

- Squares have congruent sides so it's 5 all around.
- Squares have sides that are all the same length so if we know one side, we know the rest of the sides.
- We can just add 5 and 5 and 5 and 5 since the side lengths are all the same.
- We can't, we don't have the other sides!

Oh, I hear some interesting ideas! It sounds like some of us are using what we know about squares to help us find the perimeter. So, **what do we know about squares? What's special about squares?** They have 4 equal sides! That's right, all four sides of a square are the exact same length. So if we know one side, we also know the other sides.

Great, so take a moment to calculate the perimeter of the square and then we'll share out. So, what's the perimeter?The perimeter of the square is 20 units!

Let's Think (Slide 6): We are off to a great start understanding perimeter. Let's take a look at a different type of shape to see if we can figure out the dimensions and the perimeter. Before we get started with measurements for this shape, let's first figure out how many sides the shape has. The shape has 6 sides so it is a hexagon. Excellent, so we want to make sure that since the shape has six sides, we have six measurements to be able to find the perimeter of the shape.



But, uh oh! We're missing one of the sides! This is reminding me of some of the work we did in our area unit, how can we find the missing side (*point).* Well, we know that these two sides are congruent of the same (*draw lines*).

The right long side is made up of 3 cm and 3 cm so that means that the whole length of this side is 6 cm.

Now we can go ahead and write an equation below the shape that shows me how you will calculate perimeter…3 + 3 + 5 + 3 + 8 + 6 = _____ cm

Let's both add it up and see what we get! The perimeter is 28 centimeters. (*Always encourage the student to include the units with their responses.)*

Let's Try it (Slide 7): Now we are going to work to apply our understanding of perimeter to some practice. Remember, sometimes we will be given a grid that can help us count units to find the side lengths, but sometimes we will need to measure to find the dimensions. We also need to use our understanding of attributes and congruent sides to help us figure out side lengths of some polygons. Then, once we know all of our side lengths, we can add them up to find the perimeter, or the distance around the shape.

WARM WELCOME

Today we will measure side lengths of polygons to determine perimeter.

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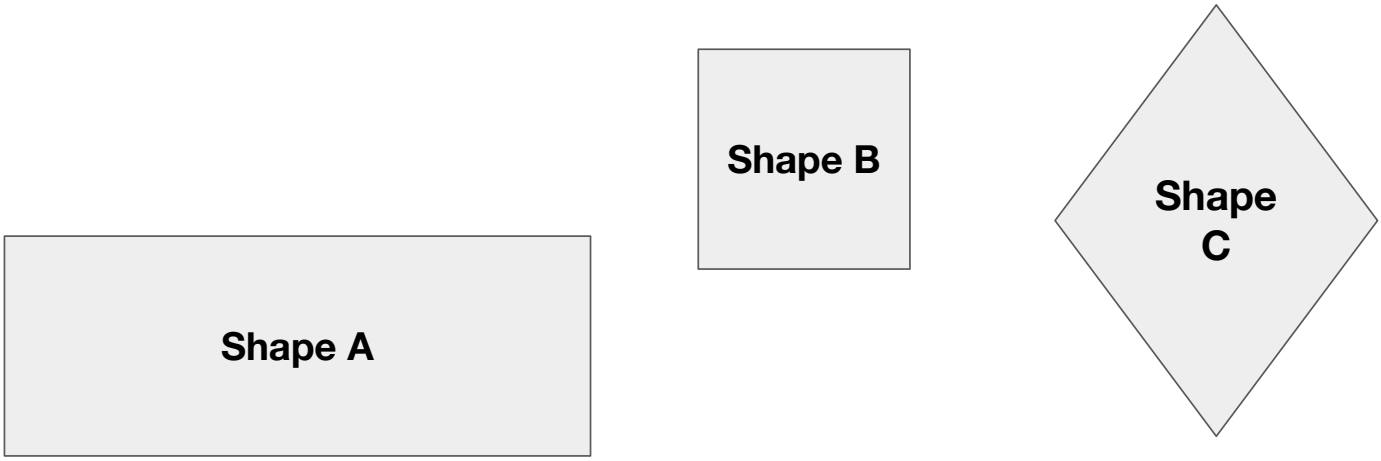
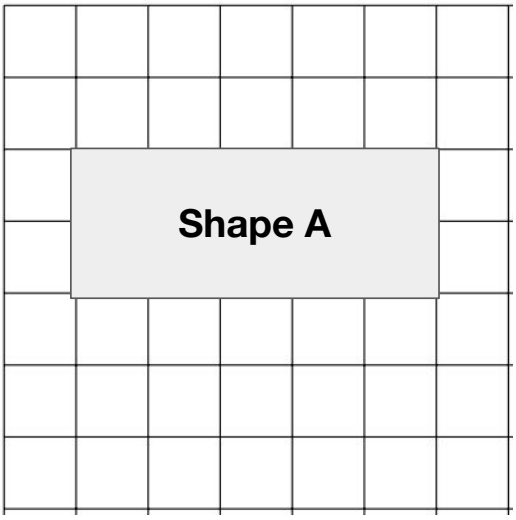
Let's Review: What is congruent?



Let's Think:

If each square is 1 centimeter, what are the dimensions or side lengths of the rectangle?

What would the perimeter be?

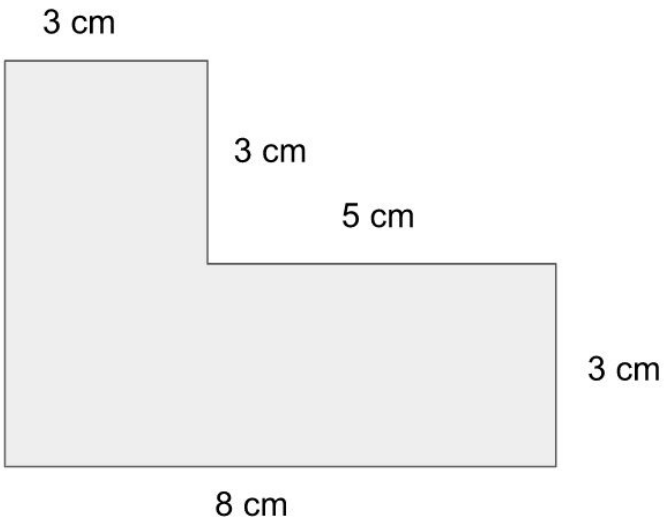


Let's Think:

What is the perimeter of the square?

Let's Think:

Let's find the perimeter.



Let's Try It:

Let's apply our understanding together.

G3 U5 Lesson 8 - Let's Try It

Student Name: _____

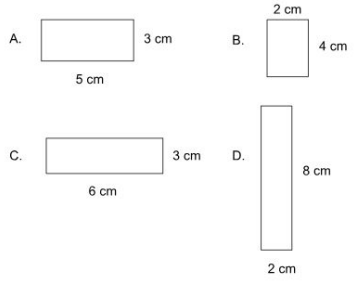
1. How do you calculate the perimeter of a polygon?

   a. Multiply length times width
   b. Multiply length times width times height
   c. Find the area and then subtract the longest side
   d. Add all of the side lengths together

2. If one side of a rhombus measures 5 centimeters, what is true about the other side lengths?

   a. They all must be greater than 5 centimeters.
   b. They all will be equal to 5 centimeters.
   c. They all will add to a total of 5 centimeters.
   d. You have to measure each side with a ruler to find out.

3. Which of the following rectangles has a perimeter of 12 centimeters? (Hint: Don't forget that a rectangle is a quadrilateral! There are **four sides** to consider.)



On your Own:

Let's try on our own.

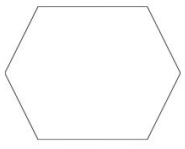
G3 U5 Lesson 8 - On Your Own

Student Name: _____

1. Which of the following are important things to remember when you are measuring with a ruler? Select two correct statements.

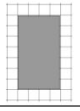
   a. Always start at the 1 inch mark on the ruler.
   b. Make sure to line up the end point of the object with the "zero" mark on the ruler.
   c. Start measuring in the middle of your object.
   d. Make sure to choose the correct side of the ruler, inches or centimeters, based on the problem.

2. Use the **inch** side of your ruler to measure the hexagon below. Label each side length, and then find the perimeter of the hexagon.



3. Which of the following statements is true?

   a. The sides of a rectangle are all congruent.
   b. If the side of a square measures 4 inches, all of the sides have to be four inches.
   c. The sides of a triangle always have to have a total perimeter of 12 inches.
   d. If one side of a hexagon measures 8 centimeters, all of the sides have to be 8 centimeters.



4. What is true about the side lengths in a rectangle?

   a. The opposite side lengths in a rectangle are congruent.
   b. All four side lengths in a rectangle will be the same.
   c. You have to measure each side length in a rectangle.
   d. The length of the top will always be equal to the length of the side.

Name: _____ G3 U5 Lesson 8 - Let's Try It

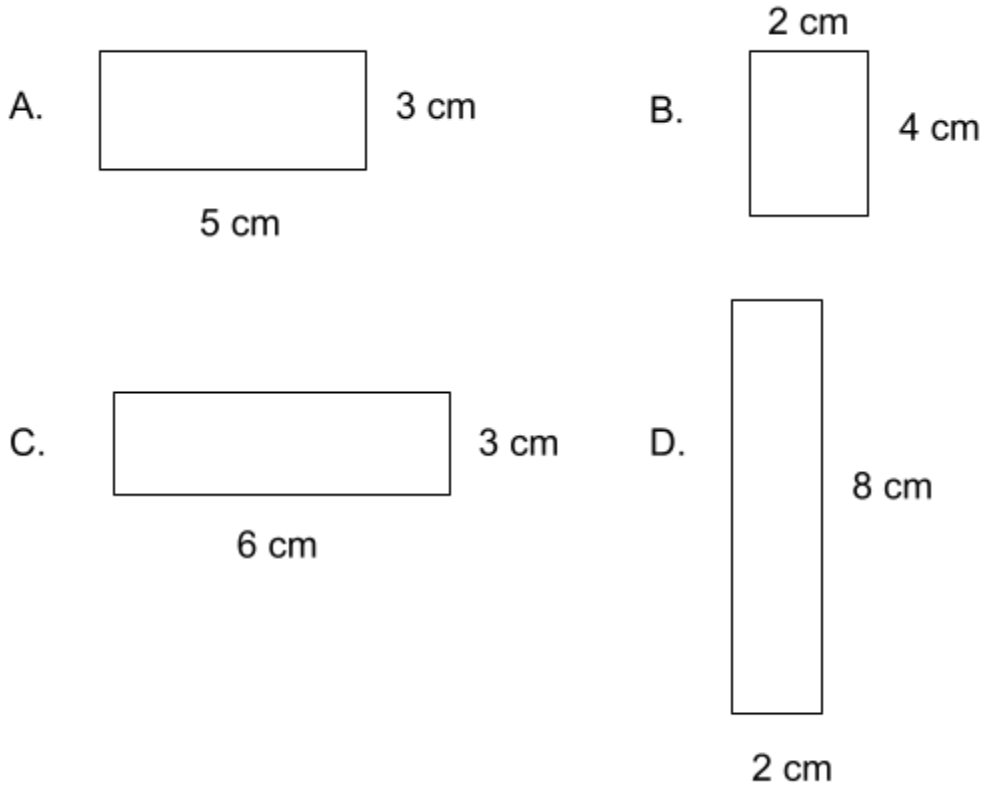
1. How do you calculate the perimeter of a polygon?

    a. Multiply length times width
    b. Multiply length times width times height
    c. Find the area and then subtract the longest side
    d. Add all of the side lengths together

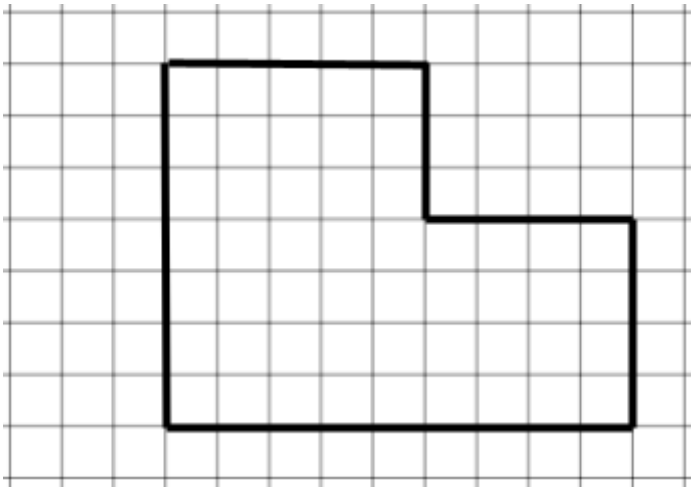
2. If one side of a rhombus measures 5 centimeters, what is true about the other side lengths?

    a. They all must be greater than 5 centimeters.
    b. They all will be equal to 5 centimeters.
    c. They all will add to a total of 5 centimeters.
    d. You have to measure each side with a ruler to find out.

3. Which of the following rectangles has a perimeter of 12 centimeters? (Hint: Don't forget that a rectangle is a quadrilateral! There are **four sides** to consider.)



4. Miguel and Victor are planting a vegetable garden in their backyard, pictured below. However, they have a big problem with rabbits eating their plants.



Part A: They want to put a fence up around the garden to protect the vegetables. If each unit represents 1 foot, how many feet of fencing should Miguel and Victor put up? (Remember to label your side lengths in the model.)

Part B: Which expression matches what you did to solve Part A?

a. (7 x 9) + (4 x 4)

b. 10 + 8 + 5 + 5 + 4 + 4

c. 7 + 9 + 4 + 4 + 3 + 5

5. Use your centimeter ruler to measure the side lengths of the shape below to the nearest whole centimeter. Label the side lengths and then calculate the perimeter of the shape.

1. Which of the following are important things to remember when you are measuring with a ruler? Select two correct statements.

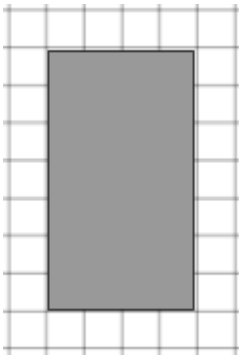
    a. Always start at the 1 inch mark on the ruler.
    b. Make sure to line up the end point of the object with the “zero” mark on the ruler.
    c. Start measuring in the middle of your object.
    d. Make sure to choose the correct side of the ruler, inches or centimeters, based on the problem.

2. Which of the following statements is true?

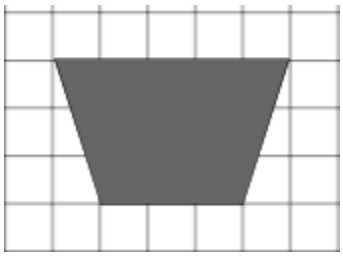
    a. The sides of a rectangle are all congruent.
    b. If the side of a square measures 4 inches, all of the sides have to be four inches.
    c. The sides of a triangle always have to have a total perimeter of 12 inches.
    d. If one side of a hexagon measures 8 centimeters, all of the sides have to be 8 centimeters.

3. What is true about the side lengths in a rectangle?

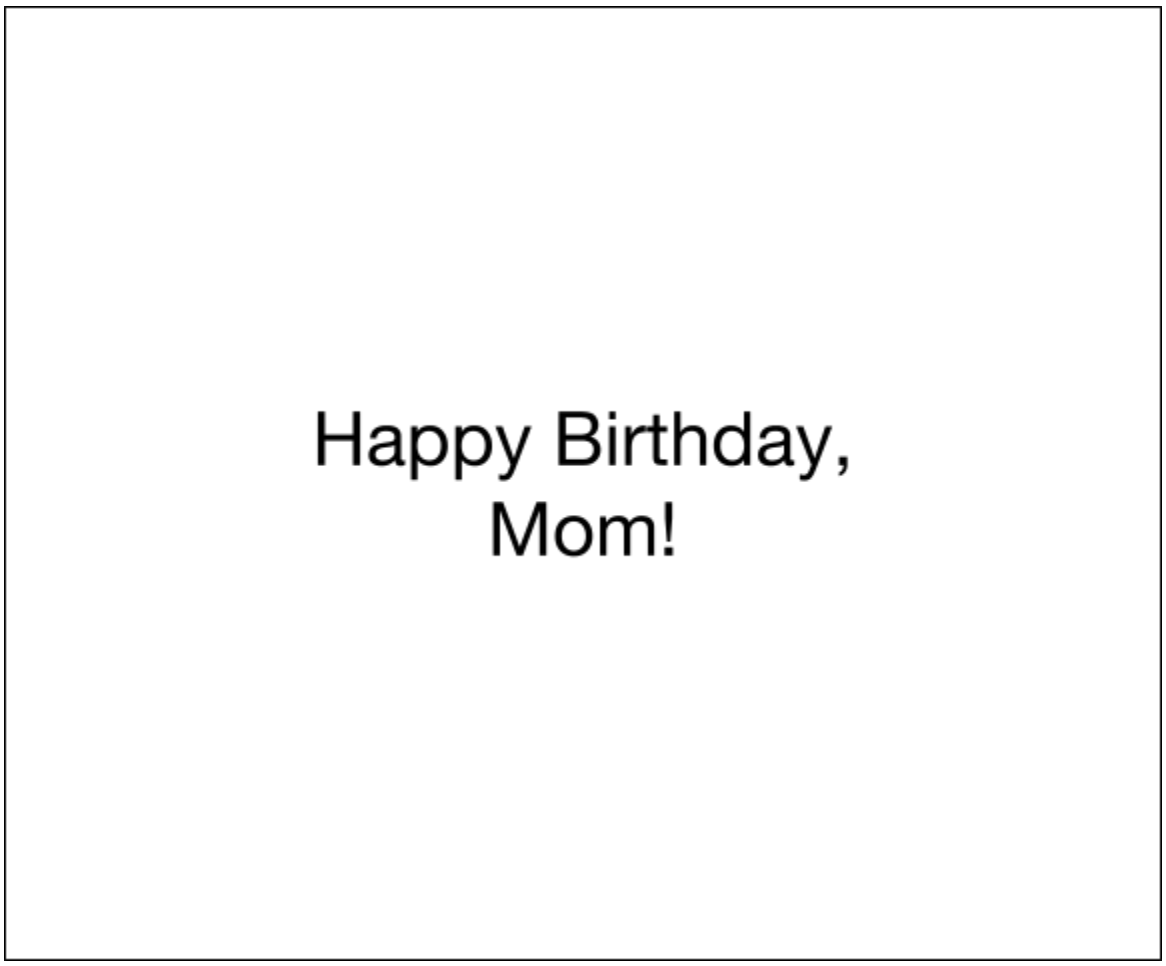
    a. The opposite side lengths in a rectangle are congruent.
    b. All four side lengths in a rectangle will be the same.
    c. You have to measure each side length in a rectangle.
    d. The length of the top will always be equal to the length of the side.

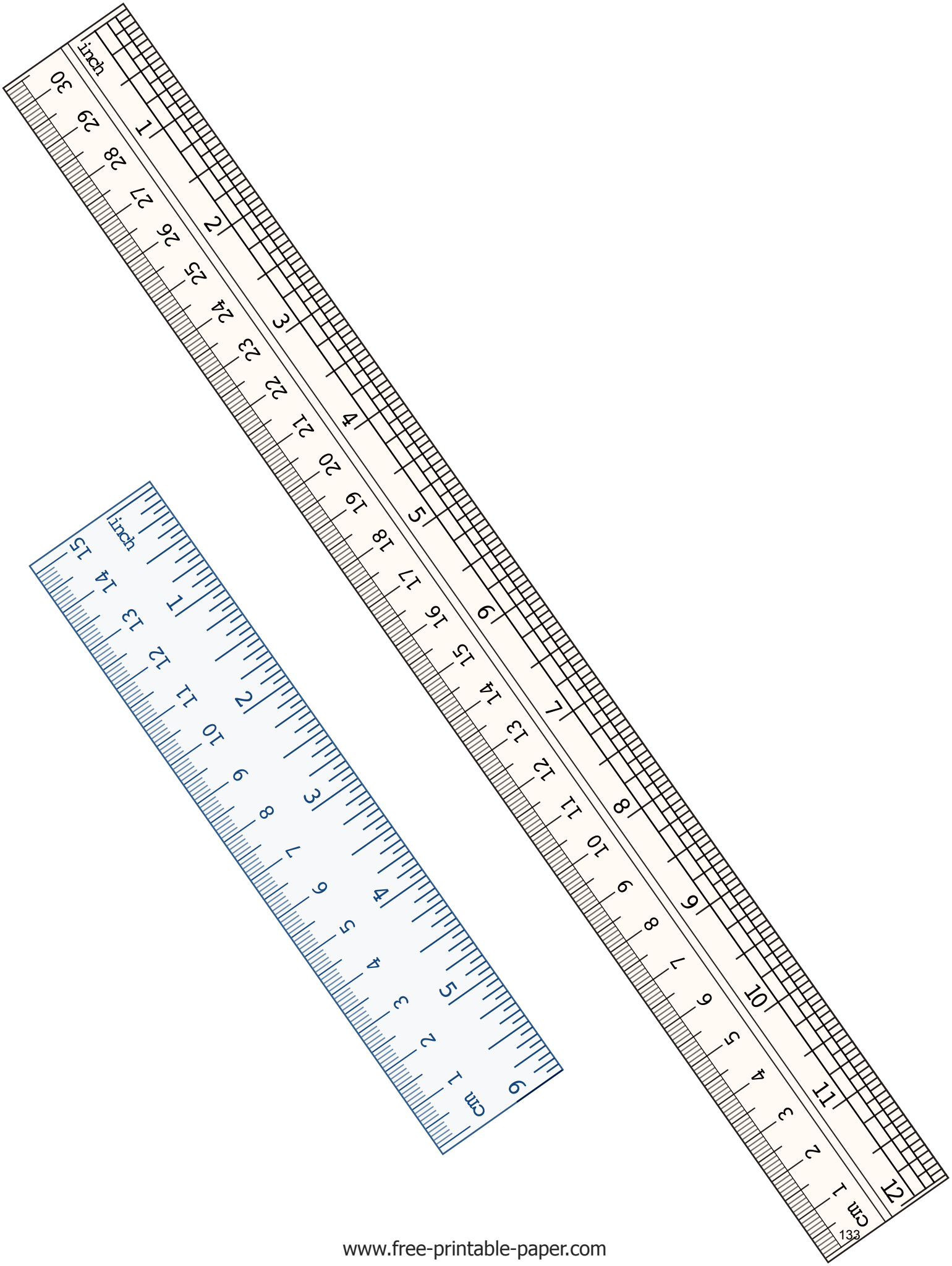


4. Label the side lengths of the trapezoid, using the grid to help you. Then, use the space below to show your work to find the perimeter of the trapezoid.



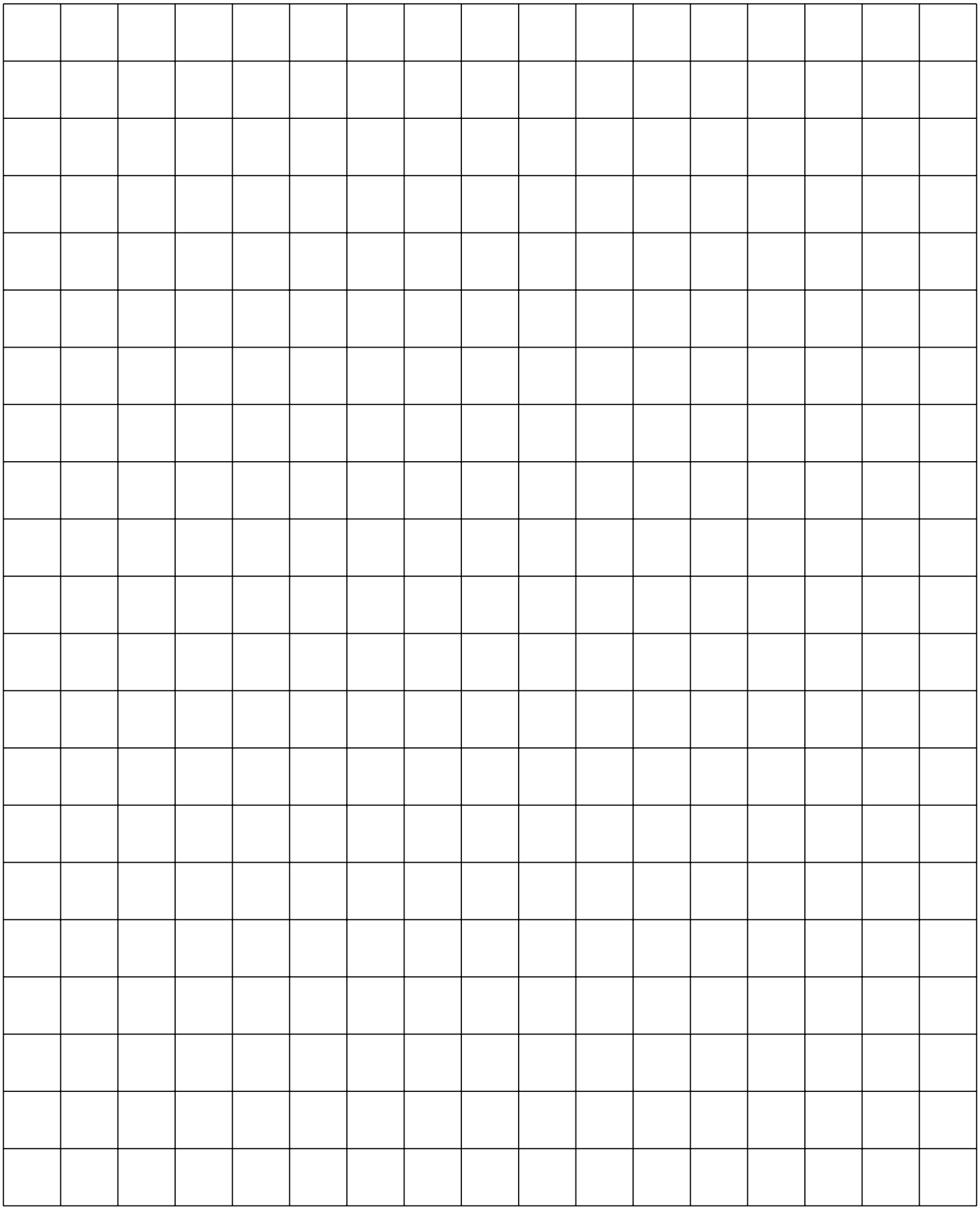
5. Tanisha made a small birthday card for her mother. The actual size of the card is pictured below. She wants to put sequins around the whole border of the card. How many inches of sequins will Tanisha use on the card?
6.
    a. Measure the dimensions of the card in inches.
    b. Label your side lengths.
    c. Calculate to find out how many inches of sequins Tanisha will use.




inch
1 2 3 4 5 6 7 8 9 10 11 12
cm 1 2
inch
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
cm 1 2 3 4 5 6

1 cm Graph Paper

One line per centimeter. Black lines.



Student Name: Answer Key

1. How do you calculate the perimeter of a polygon?

   a. Multiply length times width
   b. Multiply length times width times height
   c. Find the area and then subtract the longest side
   d. Add all of the side lengths together

2. If one side of a rhombus measures 5 centimeters, what is true about the other side lengths?

   a. They all must be greater than 5 centimeters.
   b. They all will be equal to 5 centimeters.
   c. They all will add to a total of 5 centimeters.
   d. You have to measure each side with a ruler to find out.

3. Which of the following rectangles has a perimeter of 12 centimeters? (Hint: Don't forget that a rectangle is a quadrilateral! There are **four sides** to consider.)

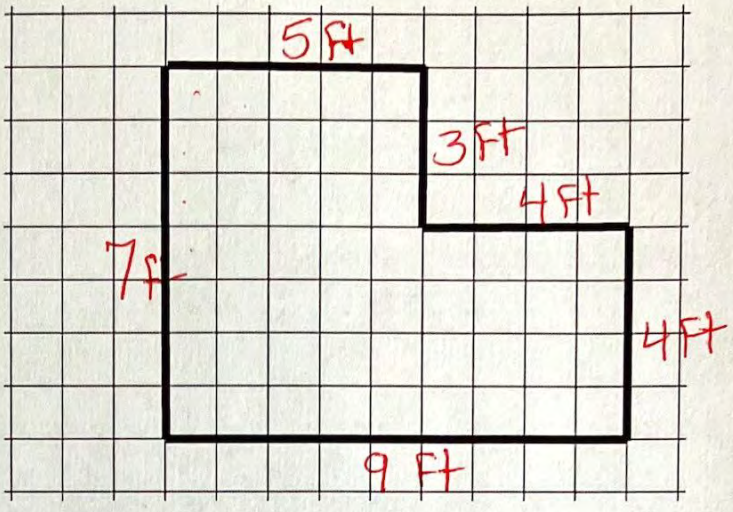
A. 5 cm, 3 cm, 5 cm, 3 cm — 5+5+3+3 = 16 cm

B. 2 cm, 4 cm, 2 cm, 4 cm — 2+2+4+4 = 12 cm

C. 6 cm, 3 cm, 6 cm, 3 cm — 6+6+3+3 = 18 cm

D. 2 cm, 8 cm, 2 cm, 8 cm — 2+2+8+8 = 20 cm

4. Miguel and Victor are planting a vegetable garden in their backyard, pictured below. However, they have a big problem with rabbits eating their plants.



Part A: They want to put a fence up around the garden to protect the vegetables. If each unit represents 1 foot, how many feet of fencing should Miguel and Victor put up? (Remember to label your side lengths in the model.)

9ft + 7ft + 5ft + 3 ft + 4ft + 4 ft = 32

16 + 8 + 8

16 + 16

32 ft

32 Feet of fence

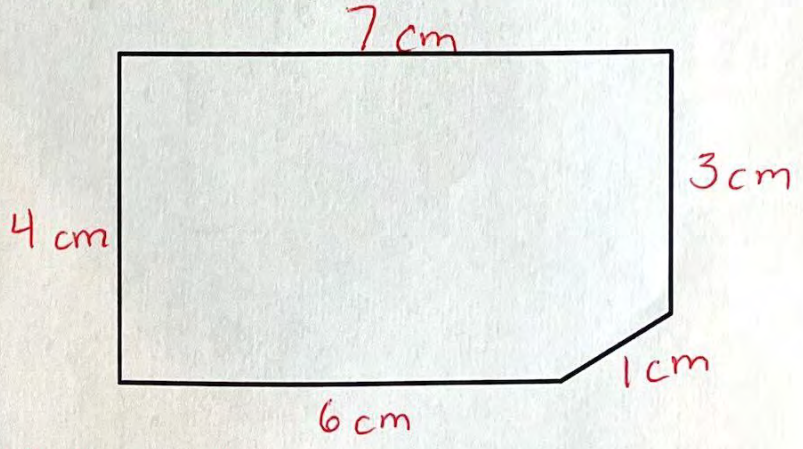
Part B: Which expression matches what you did to solve Part A?

a. (7 x 9) + (4 x 4)

b. 10 + 8 + 5 + 5 + 4 + 4

c. 7 + 9 + 4 + 4 + 3 + 5

5. Use your centimeter ruler to measure the side lengths of the shape below to the nearest whole centimeter. Label the side lengths and then calculate the perimeter of the shape.



7 + 3 + 1 + 6 + 4 = 21 cm

10 + 1 + 10

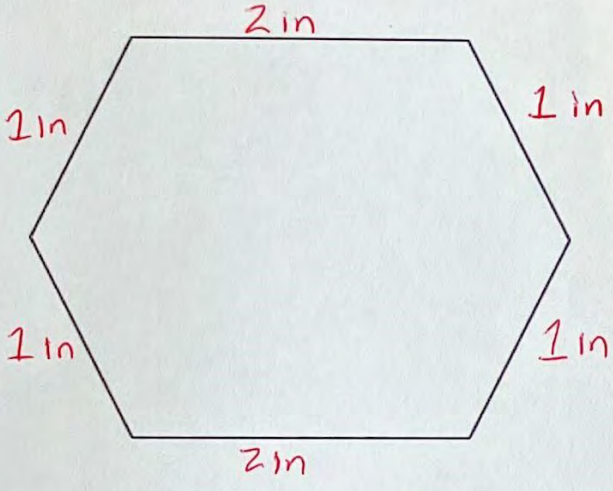
Student Name: Answer Key

1. Which of the following are important things to remember when you are measuring with a ruler? Select two correct statements.

   a. Always start at the 1 inch mark on the ruler.
   b. Make sure to line up the end point of the object with the "zero" mark on the ruler.
   c. Start measuring in the middle of your object.
   d. Make sure to choose the correct side of the ruler, inches or centimeters, based on the problem.

2. Use the **inch** side of your ruler to measure the hexagon below. Label each side length, and then find the perimeter of the hexagon.

Have student measure to the nearest inch.

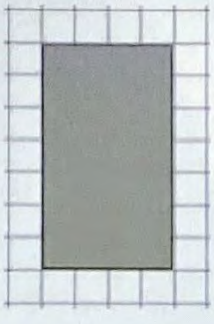


2 + 1 + 1 + 2 + 1 + 1 = 8 inches

P = 8 inches

3. Which of the following statements is true?

   a. The sides of a rectangle are all congruent.
   b. If the side of a square measures 4 inches, all of the sides have to be four inches.
   c. The sides of a triangle always have to have a total perimeter of 12 inches.
   d. If one side of a hexagon measures 8 centimeters, all of the sides have to be 8 centimeters.



4. What is true about the side lengths in a rectangle?

   a. The opposite side lengths in a rectangle are congruent.
   b. All four side lengths in a rectangle will be the same.
   c. You have to measure each side length in a rectangle.
   d. The length of the top will always be equal to the length of the side.

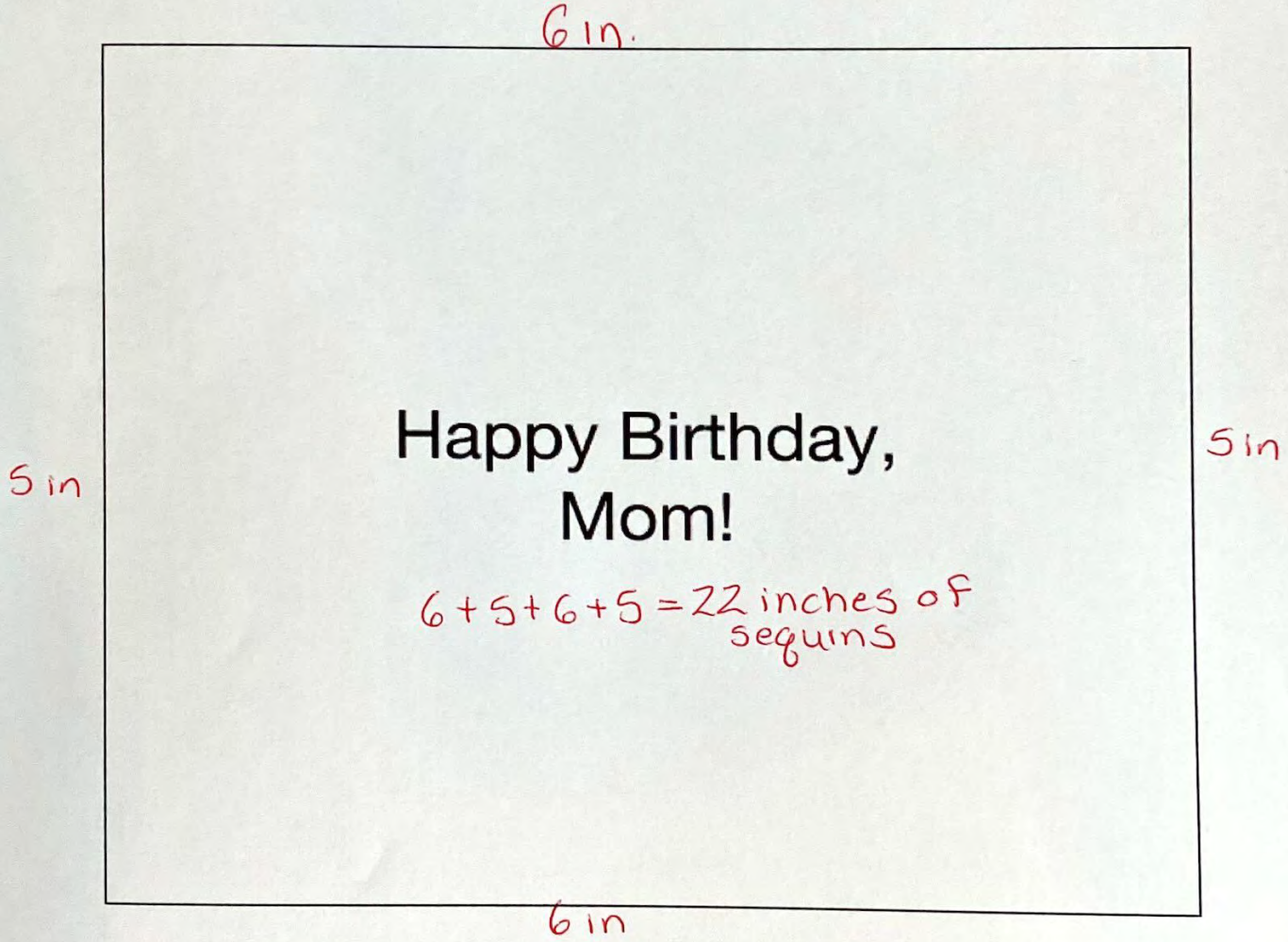
5. Tanisha made a small birthday card for her mother. The actual size of the card is pictured below. She wants to put sequins around the whole border of the card. How many inches of sequins will Tanisha use on the card?

↳ perimeter

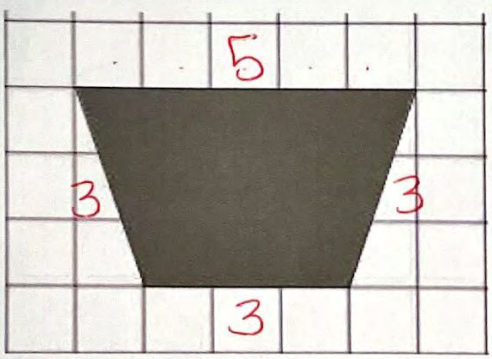
a. Measure the dimensions of the card in inches.

b. Label your side lengths.

c. Calculate to find out how many inches of sequins Tanisha will use.



$6+5+6+5=22$ inches of sequins



6. Label the side lengths of the trapezoid, using the grid to help you. Then, use the space below to show your work to find the perimeter of the trapezoid.

$5 + 3 + 3 + 3 = 14$ units

$P = 14$ units

G3 U5 Lesson 9

Determine perimeter of polygons

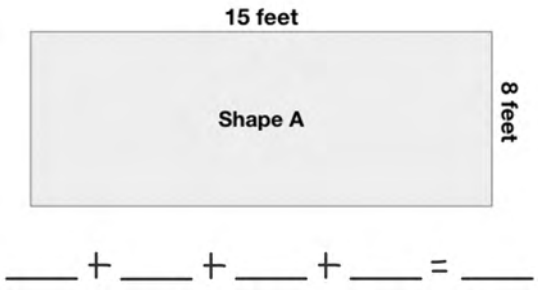
G3 U5 Lesson 9 - Students will calculate the perimeter of polygons.

Tutor Notes: The primary misconception that students demonstrate around perimeter is when sides of the given polygon are not explicitly labeled. The missing side lengths can either be determined by applying understanding of attributes of the shape such as all congruent sides or opposite congruent sides, or decomposing the composite shape into two or three smaller, simpler shapes (like students did in the area unit) and using other given side lengths to fill in the missing parts. One way to support students in preventing this misconception is first beginning by determining how many sides the shape has and writing an equation with blank lines to represent each side totaled together. Then, the student can fill in the given lengths and apply their other understanding to determine the missing lengths. This can help prevent them from inadvertently missing a side when calculating perimeter.

Warm Welcome (Slide 1): Tutor choice

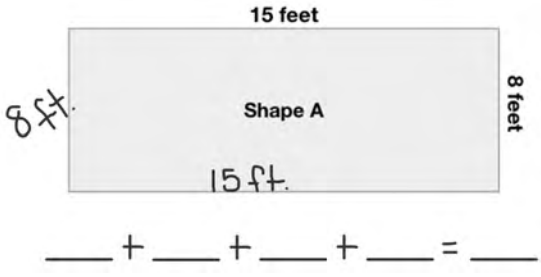
Frame the Learning/Connect to Prior Learning (Slide 2): Last time we met, we learned about perimeter. Remember that perimeter is the distance around a shape like the boundary lines on a sports field, the border on a bulletin board at school, or the sidewalk around a park. We can calculate perimeter by adding all of the side lengths together. Today, we will continue to explore perimeter.

Let's Review (Slide 3): Notice that the shape does not have all of its side lengths labeled, so in order to determine perimeter for this shape, I have to consider what I understand about the attributes of the shape. Let's start by looking at Shape A. First, how many sides does Shape A have? Shape A has 4 sides.



So I know that when I am finding the perimeter of Shape A, I'm going to have to add four side lengths together. To help myself remember that, I am going to set up this equation to make sure I don't miss any of the side lengths.

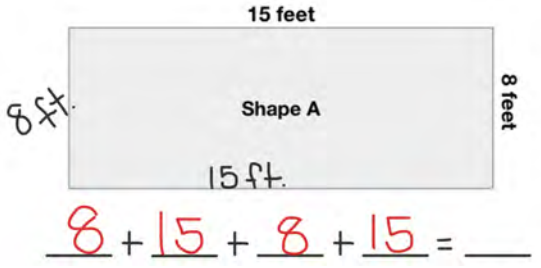
Now, what type of polygon is Shape A? Shape A is a rectangle.



Exactly, so what do we know about rectangles that can help me determine what the other side lengths would be? Possible Student Answers, Key Points:

- A rectangle has opposite sides congruent.
- The top and bottom would be the same, so the bottom would be 15 feet too. The sides are also the same so the other side would be 8 feet.

That's right, we know that opposite sides of rectangles are congruent.



So now that I figured that out, how would I find the perimeter? Add all the side lengths together. Add 15 + 15 + 8 + 8.

Nice work, so when we would add that up, we would get a perimeter of 46 feet.

Let's Talk (Slide 4): Let's look at Shapes B and C on this slide. We are going to find the perimeter of each shape. Shape B is another rectangle, so what do I need to do to find the perimeter of Shape B? You know the bottom would also be 14 inches and the other side would be 8 inches. Then you can add up all four sides so 14 + 14 + 8 + 8. *(Encourage the student to label the side lengths and write out the equation while they are explaining.)* So, what is the perimeter of Shape B? The perimeter is 44 inches.

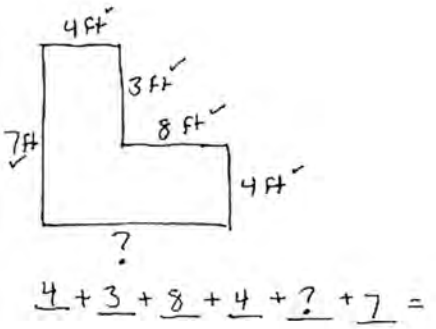
Great! Let's take a look at Shape C. How many sides does Shape C have?Shape C has 4 sides.

What type of polygon is Shape C? Shape C is a rhombus. How might we figure out the other side lengths for Shape C? Rhombuses have four congruent sides, so we know all of the sides are 11 inches.

Ok, so how can we use that understanding to calculate perimeter? We can add 11 + 11 + 11 + 11 or we can think 4 x 11 since all four sides are the same.

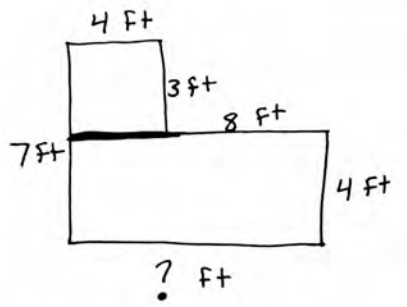
Oh interesting! So the rhombus also has a perimeter of 44 inches. So shapes can have different dimensions but the same perimeter.

Let's Think (Slide 5): Now we are going to look at another type of irregular shape with a missing side length. Let's start by counting the sides to see how many side lengths we need to have in our equation.



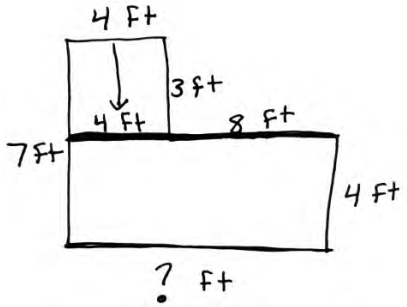
So we know we have six sides, but our bottom side length is missing. *(Model writing out the equation with the six blanks. Known side lengths can be filled in.)*

We need to decompose or break down the shape into smaller parts to help us figure out the missing side. What smaller shape do you see within this shape? I see rectangles.

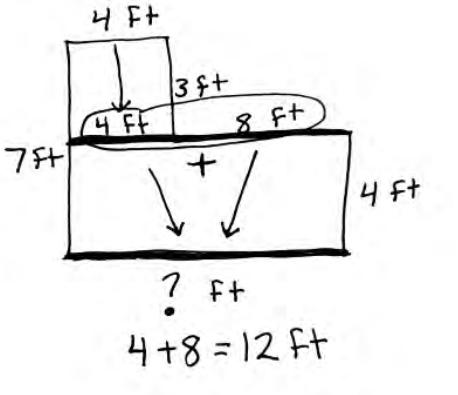


Great - we can see two rectangles within this shape. We can split it vertically or horizontally. We are going to split it horizontally to help us see what the bottom side length will be.

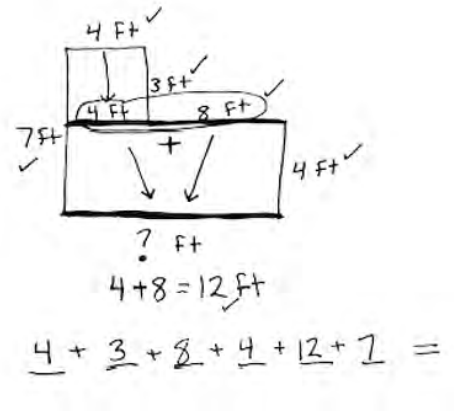
Now that we have two smaller rectangles, we can use what we know about the attributes of rectangles to help us. Remember that opposite sides in a rectangle are congruent. So what other lengths do we see in the shape that can help us? In the smaller rectangle at the top, we know the top side is 4 feet, so that means the smaller part of the horizontal cut would be 4 feet.



Ok, now let's think about the bigger rectangle we created on the bottom. Now, what do you notice about the length of the top of that rectangle? We know that one part is 4 feet and the other part is 8 ft.
How might that help us figure out the missing length at the bottom of that rectangle? I know that opposite sides in the rectangle are congruent, so if the top is 4 ft and 8 ft, that means the bottom would be the same length. 8 + 4 = 12, so the bottom length is 12 feet.



So we started off with a missing side length, we decomposed the shape into two smaller rectangles, and used our understanding of the attributes of rectangles to find the missing side length. That was hard work, but we aren't done yet! Now that we have found our missing side, what do we need to do in order to find a perimeter? We need to add all of the side lengths together.



Let's revisit the equation we wrote at the very beginning of this problem when we counted six sides in our polygon. We filled in the sides we already knew, so now we just need to fill in our missing side and calculate the perimeter. The total perimeter is 38 feet.

Great job. Finding missing side lengths in irregular shapes is a really tough skill, and you did a great job working through that with me!

Let's Try it (Slides 6-7): Now we are going to practice finding the perimeter of polygons together. Remember to start by counting the number of sides in the polygon so we make sure we find any missing side lengths before calculating the perimeter.

WARM WELCOME

Today we will calculate the perimeter of polygons.

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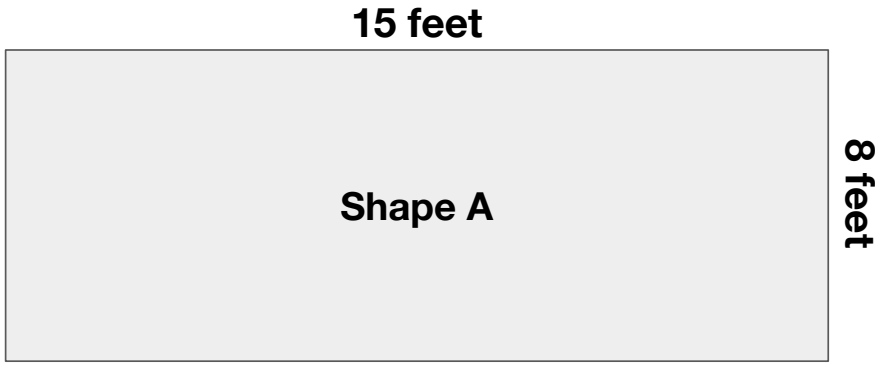
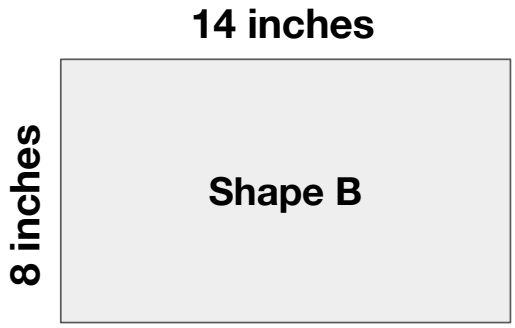
Let's Review:

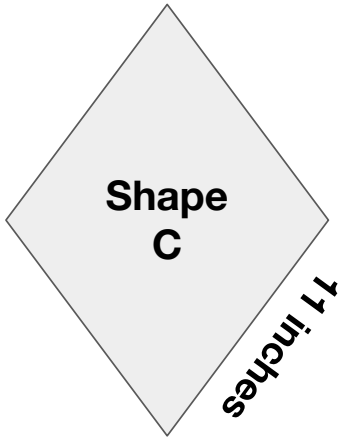
How do we find perimeter?



Let's Talk:

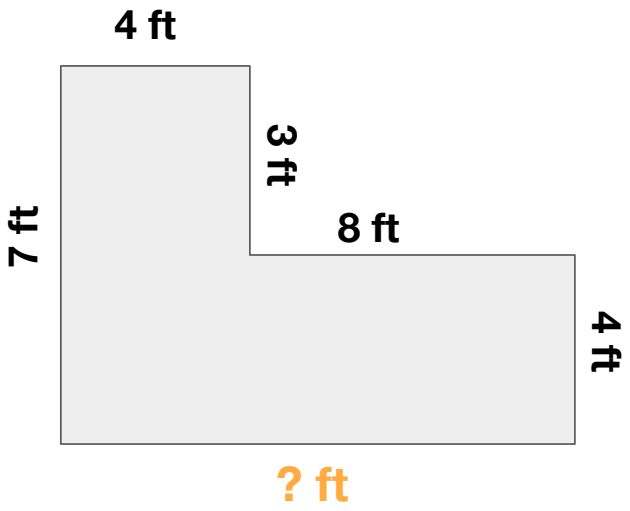
Find the perimeters.
What do you notice?





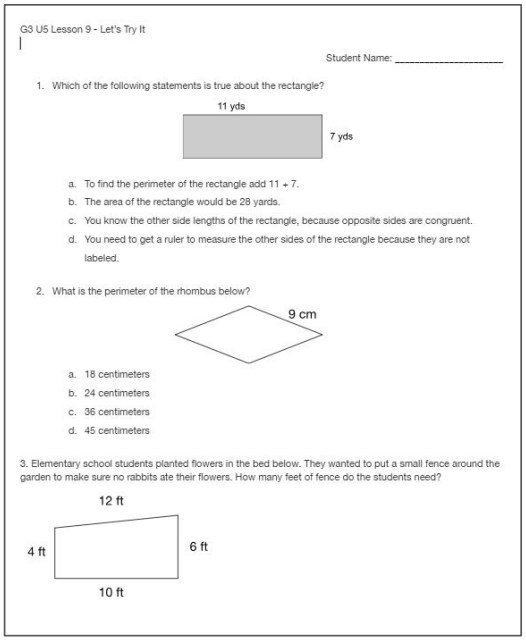
Let's Think:

How might we find the perimeter?



Let's Try It:

Let's apply our understanding together.



G3 U5 Lesson 9 - Let's Try It

Student Name: _____

1. Which of the following statements is true about the rectangle?

a. To find the perimeter of the rectangle add 11 + 7.
b. The area of the rectangle would be 28 yards.
c. You know the other side lengths of the rectangle, because opposite sides are congruent.
d. You need to get a ruler to measure the other sides of the rectangle because they are not labeled.

2. What is the perimeter of the rhombus below?

a. 18 centimeters
b. 24 centimeters
c. 36 centimeters
d. 45 centimeters

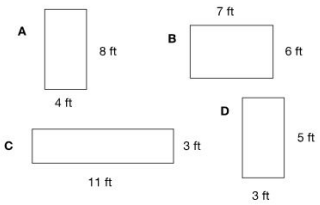
3. Elementary school students planted flowers in the bed below. They wanted to put a small fence around the garden to make sure no rabbits ate their flowers. How many feet of fence do the students need?

On your Own:

Let’s try on our own.

G3 U5 Lesson 9- On Your Own

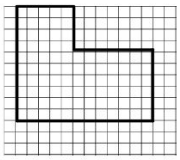
1. Which of the following rectangles has a perimeter of 24 meters?



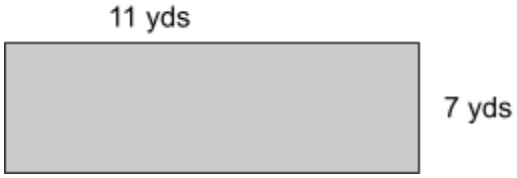
2. Carmen was making a nice card for her mom on Mother’s Day. She used 28 inches of lace **border** around the edges of her card. Which of the following could be the dimensions (length and width) of Carmen’s card? (Hint: Draw models of the card to help you if needed.)

   a. 12 in x 16 in
   b. 7 in x 4 in
   c. 9 in x 19 in
   d. 8 in x 6 in

3. They are building a new dog park in the Anacostia neighborhood. The model of the dog park is drawn below. If each square represents one foot, how many feet of fence will be needed for the new dog park? (Remember to label your side lengths and write your equation.)



1. Which of the following statements is true about the rectangle?



   a. To find the perimeter of the rectangle add 11 + 7.
   b. The area of the rectangle would be 28 yards.
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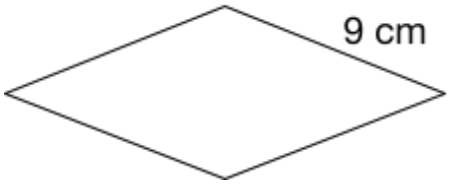
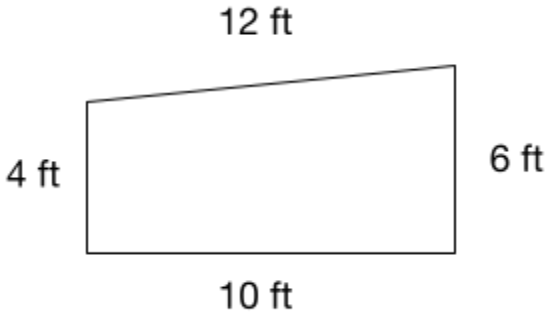
   d. You need to get a ruler to measure the other sides of the rectangle because they are not labeled.

2. What is the perimeter of the rhombus below?



   a. 18 centimeters
   b. 24 centimeters
   c. 36 centimeters
   d. 45 centimeters

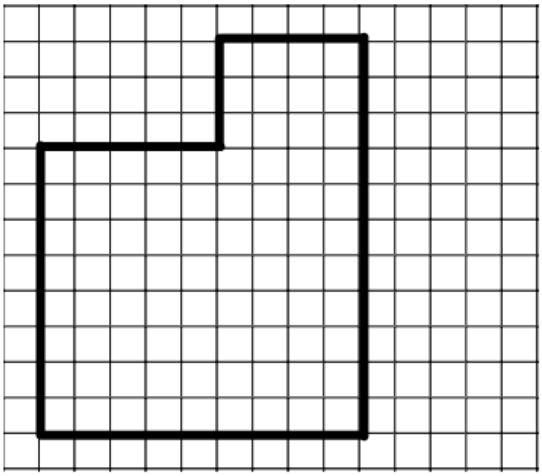
3. Elementary school students planted flowers in the bed below. They wanted to put a small fence around the garden to make sure no rabbits ate their flowers. How many feet of fence do the students need?



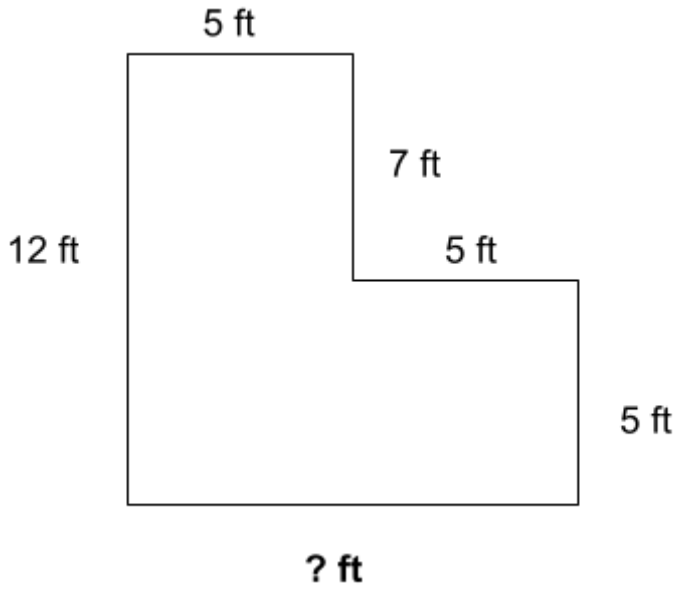
4. Which of the following statements is true?

a. A square with a side length of 5 ft has a perimeter of 20 ft.
b. A rectangle with a length of 6 ft and a width of 4 ft has a perimeter of 24 ft.
c. A rhombus with a side length of 3 ft has a perimeter of 9 ft.
d. A trapezoid with a side length of 9 ft has a perimeter of 36 ft.

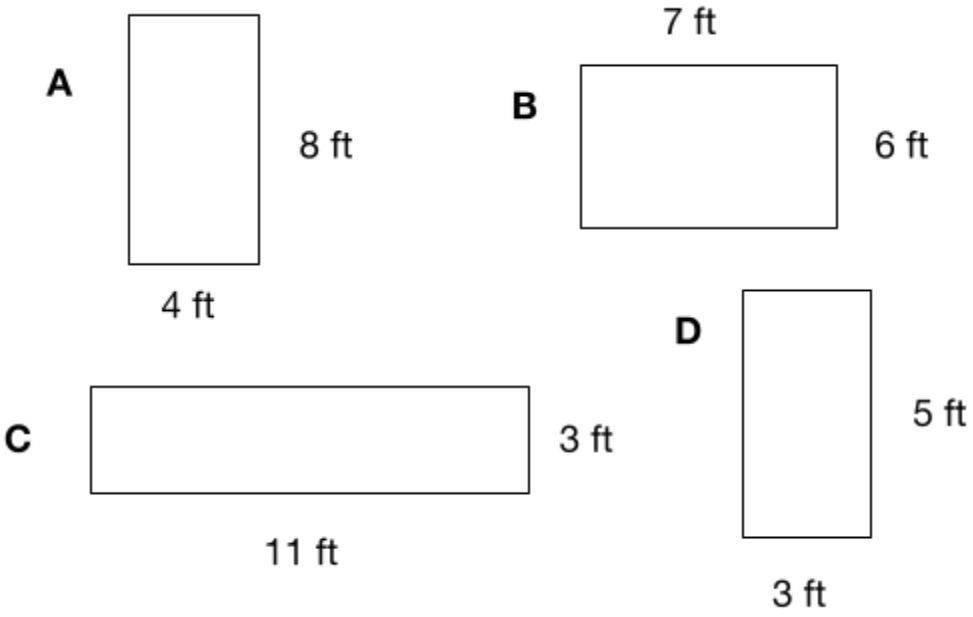
5. Below is the outline of a local pool. The city is going to put in new tile around the edges of the pool over the winter. If one square in the grid equals one foot, how many feet of tile does the city need for the edges of the pool?



6. Find the perimeter of the shape below. Show your work by marking up your shape and writing your equation. Remember to find the missing side length first!



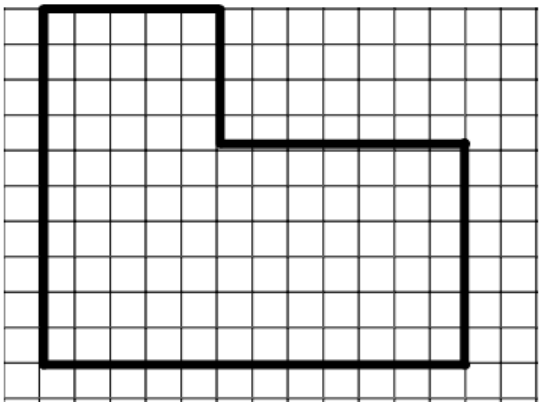
1. Which of the following rectangles has a perimeter of 24 feet?



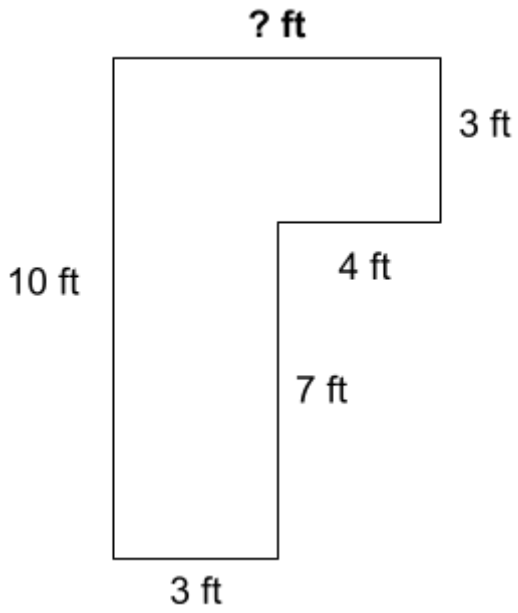
2. Carmen was making a nice card for her mom on Mother's Day. She used 28 inches of lace **border** around the edges of her card. Which of the following could be the dimensions (length and width) of Carmen's card? (Hint: Draw models of the card to help you if needed.)

   a. 12 in x 16 in
   b. 7 in x 4 in
   c. 9 in x 19 in
   d. 8 in x 6 in

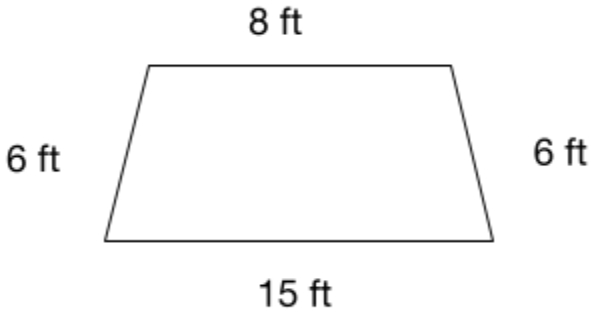
3. They are building a new dog park in the Anacostia neighborhood. The model of the dog park is drawn below. If each square represents one foot, how many feet of fence will be needed for the new dog park? (Remember to label your side lengths and write your equation.)



4. Find the perimeter of the shape below. Show your work by marking up the side lengths and writing your equation. Remember to find the missing side length first!

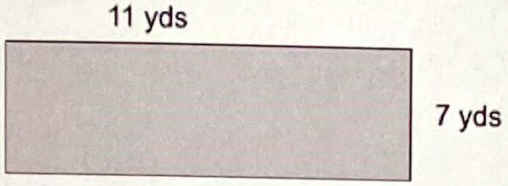


5. The third graders made up a new game to play at recess. Below is a picture of the field they created for the game. They want to paint boundary lines around their field. How many feet of boundary lines do they need to paint?



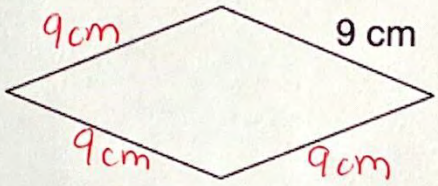
Student Name: Answer Key

1. Which of the following statements is true about the rectangle?



   a. To find the perimeter of the rectangle add 11 + 7.
   b. The area of the rectangle would be 28 yards.
   c. You know the other side lengths of the rectangle, because opposite sides are congruent.
   d. You need to get a ruler to measure the other sides of the rectangle because they are not labeled.

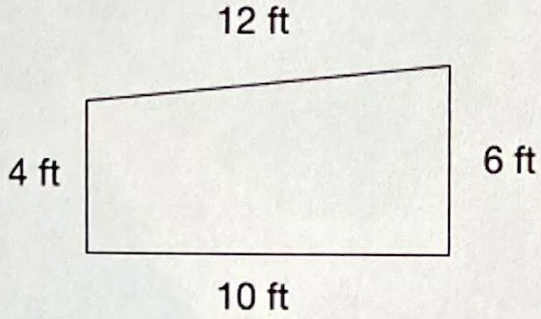
2. What is the perimeter of the rhombus below?



   a. 18 centimeters
   b. 24 centimeters
   c. 36 centimeters
   d. 45 centimeters

9+9+9+9= ___ cm
4×9 = 36 cm

3. Elementary school students planted flowers in the bed below. They wanted to put a small fence around the garden to make sure no rabbits ate their flowers. How many feet of fence do the students need?



12 + 6 + 10 + 4 = ___ ft
18 + 14 = 32 ft
32 feet of Fence

4. Which of the following statements is true?

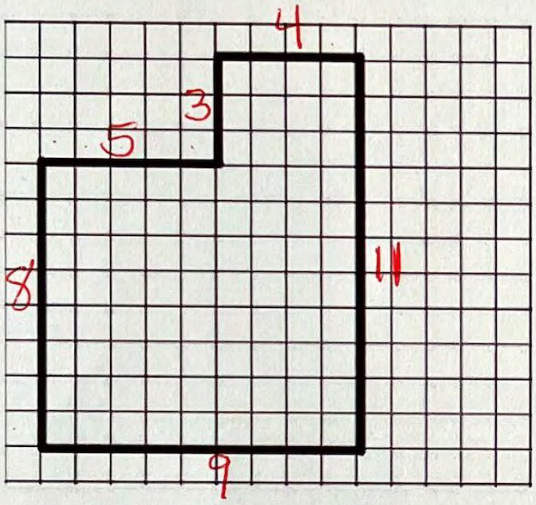
a. A square with a side length of 5 ft has a perimeter of 20 ft.

b. A rectangle with a length of 6 ft and a width of 4 ft has a perimeter of 24 ft. 6+4+6+4=20 ft

c. A rhombus with a side length of 3 ft has a perimeter of 9 ft. 3+3+3+3=12 ft

d. A trapezoid with a side length of 9 ft has a perimeter of 36 ft.

5. Below is the outline of a local pool. The city is going to put in new tile around the edges of the pool over the winter. If one square in the grid equals one foot, how many feet of tile does the city need for the edges of the pool?

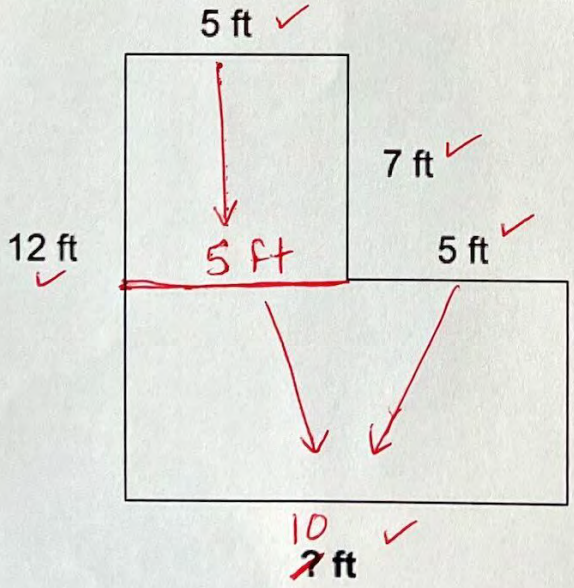


4+11+9+8+5+3=____ ft

4+20+16 = 40 ft

40 feet of tile

6. Find the perimeter of the shape below. Show your work by marking up your shape and writing your equation. Remember to find the missing side length first!



5+7+5+5+10+12 = 44 ft

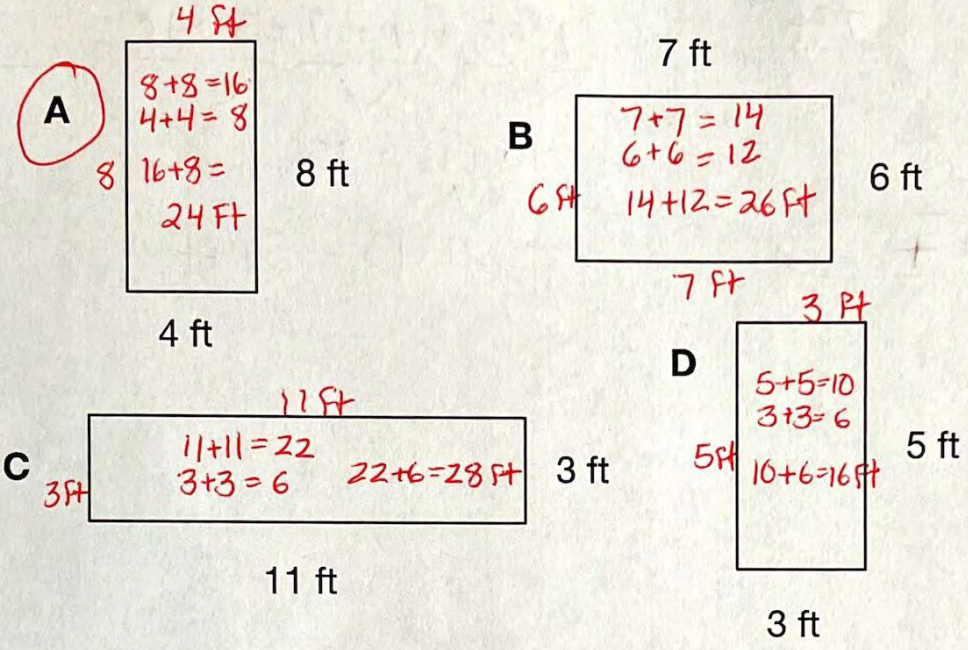
12+20+12

44 ft

P=44 ft

Student Name: Answer Key

1. Which of the following rectangles has a perimeter of 24 feet?



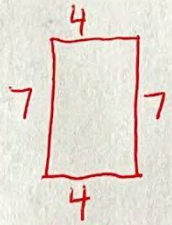
2. Carmen was making a nice card for her mom on Mother's Day. She used 28 inches of lace **border** around the edges of her card. Which of the following could be the dimensions (length and width) of Carmen's card? (Hint: Draw models of the card to help you if needed.)

a. 12 in x 16 in too big

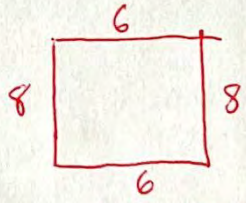
b. 7 in x 4 in

c. 9 in x 19 in too big

d. 8 in x 6 in

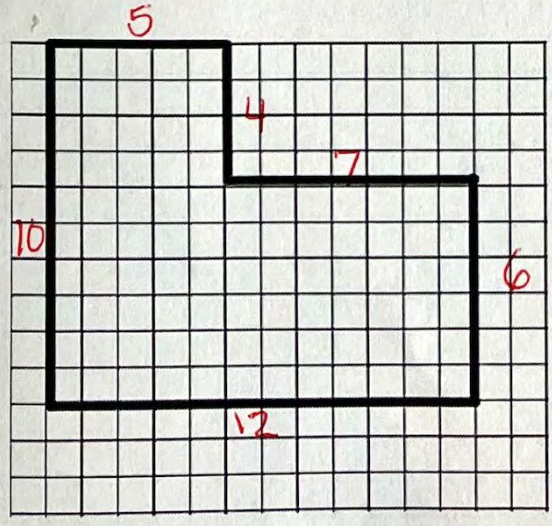


4+4+7+7=8+14=22in



6+6+8+8=12+16=28 in

3. They are building a new dog park in the Anacostia neighborhood. The model of the dog park is drawn below. If each square represents one foot, how many feet of fence will be needed for the new dog park? (Remember to label your side lengths and write your equation.)



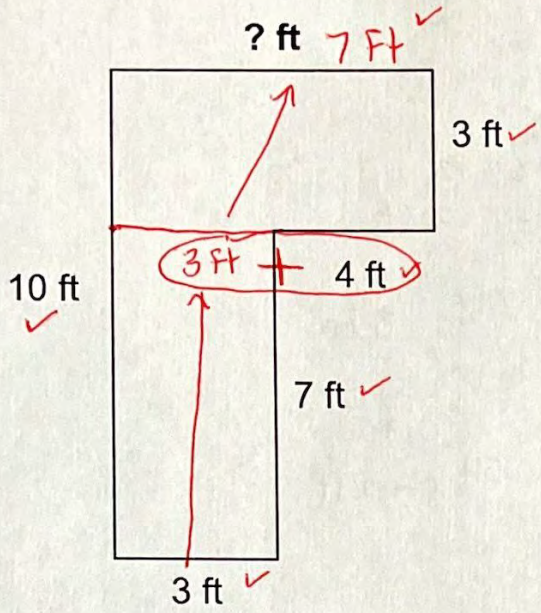
5+4+7+6+12+10=___

9+13+22=___

22+22=44

44 ft of fence

4. Find the perimeter of the shape below. Show your work by marking up the side lengths and writing your equation. Remember to find the missing side length first!

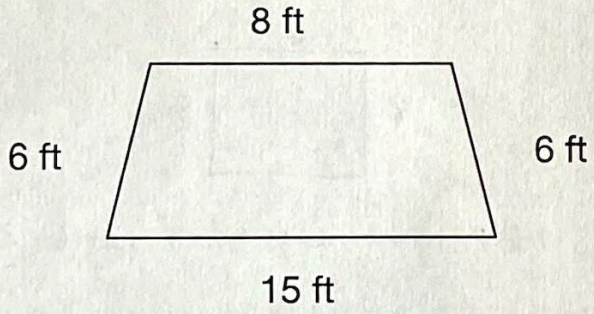


7 + 3 + 4 + 7 + 3 + 10 = ___ Ft

10 + 11 + 13

21 + 13 = 34 Ft

5. The third graders made up a new game to play at recess. Below is a picture of the field they created for the game. They want to paint boundary lines around their field. How many feet of boundary lines do they need to paint?



8 + 6 + 15 + 6 = ___ ft

14 + 21 = 35 ft

14
+21
35 ft of boundary lines

G3 U5 Lesson 10

Calculate area and perimeters

G3 U5 Lesson 10 - Students will find area or perimeter of rectangles depending on the context

Tutor Notes: As part of Unit 3, students have already completed an extensive study of area. In third grade, students need to understand how to find area of rectangles and composite shapes that can be decomposed into rectangles. They also must understand the real-world contexts that require both perimeter and area. In most cases, students will be presented with problems that do not include the words perimeter or area, but simply include contexts such as tiling a floor, painting a wall, or building a fence that imply which calculation they need to perform. Students should first reason with the context of the problem and ask themselves if the problem is asking about the area or space being covered by something or if the context of the problem is asking about the distance around something. This reasoning is critical to their success with the overall work of this set of third grade standards.

Warm Welcome (Slide 1): Tutor choice

Frame the Learning/Connect to Prior Learning (Slide 2): You have worked so hard throughout this unit to deepen your understanding about shapes and their attributes and calculate perimeter. During our last lesson in this unit, we are going to bring back some of the work we did earlier in the year with area to help us determine when we need to solve for the perimeter of rectangles and when we need to solve for the area. Knowing the contexts or real-world examples of when we need to find perimeter and area will help you, not just with this lesson, but when you're older it's going to be very helpful anytime you want to do a project at your house!

Let's Review (Slide 3): Let's get started by reminding ourselves what perimeter and area actually mean. **What are we finding when we calculate perimeter?** Perimeter is the distance around a shape. **And are we solving for when we find area?** Area is the space inside a shape or the amount of space a shape covers.

Great. Now that we have reminded ourselves what area and perimeter actually mean, **how do we calculate them? What equation do we use to find the perimeter of a rectangle?** We have to add all four side lengths together. Nice! So, **what equation do we use to calculate the area of a rectangle?** We multiply length times width.

You remember a lot of the important ideas you learned in the area unit and during our last few lessons together about perimeter. **Let's take a few minutes to brainstorm 2-3 real-life examples of when we need to solve for area or perimeter.** Take a moment to think and let me know when you have an idea.

Let's Review (Slide 4): You brainstormed some great ideas! Here are a few more ideas that are examples of solving for area and perimeter as well. We will be working through contexts like this today in our lesson to help us decide if we are solving for perimeter or area, or both.

Let's Talk (Slide 5): We have a set of real-life examples listed on this slide and we will work together to figure out if it requires us to solve for perimeter or solve for area. *(Read each item aloud to the student.)* **Do you think this situation requires us to solve for the perimeter or solve for the area? Why?** Possible Student Answers, Key Points:

- Painting lines around a field would be perimeter. You need to know the distance around the field for the boundary lines.
- Making a cage would be perimeter. You build a cage to go around something like a pet or a plant. You have to know how much fence or wire you need.
- Hanging a border is perimeter because it goes around a poster or a bulletin board.
- Sewing a tablecloth would be an area because a tablecloth covers a table. You need to know how much fabric you need to cover the whole table.
- Building a fence would be perimeter because a fence goes around a yard or a garden.

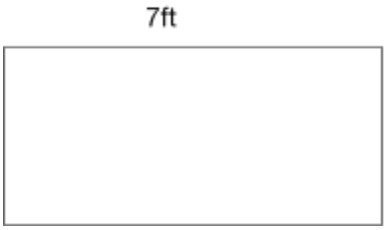
- Painting a wall would be an area because the paint covers the wall.
- Pouring concrete for a sidewalk would be an area because the sidewalk is covering part of the ground.
- Planting plants in a garden would be an area because the plants are taking up space inside the garden. Each plant needs its own amount of space in the garden.

You did a great job reasoning through each of those situations. On the next slide, we are going to find out how we did!

Let's Talk (Slide 6): How did we do with that activity? Are there any answers that were surprising to you that you want to talk about a bit more before we move onto the next part?

Let's Think (Slide 7): Let's read this problem together. We are going to determine which part of the problem requires us to solve for the area and which part of the problem requires us to solve for the perimeter.

Let's read this together, "The Bakers put a new rectangular flower bed in their backyard. The flower bed is 7 feet by 3 feet. Part A says they want to put a fence up around the flower bed so that groundhogs don't eat all of the petals. How many feet of fencing do the Bakers need? Part B: Then, the Bakers went to the garden shop to get some seeds to plant in their flower bed. If each of the flowers they want to plant takes up one square foot, how many seeds should they purchase at the garden shop?"



Hmm, I think it might be helpful for us to start by drawing a model of the flower bed. What should I draw for the model? What should I label? You should draw a rectangle. The long side (length) should be 6 ft and the side (width) should be 3 ft.

Let's look at Part A, this is making me think we need to solve for perimeter. A fence goes around a garden, so they need to know the distance around the garden to know how much fence to buy.

Let's solve that problem for the Bakers. How many feet of fencing do they need for their garden? (*Encourage students to try on their own)* The Bakers will need 20 feet of fencing.

So, Part A was asking us about perimeter, the distance around the outside of the garden. Let's look at Part B. **What clues did you notice about the situation in Part B?** Possible Student Answers, Key Points:

- Part B is asking about planting seeds in the garden. I know that the seeds will take up space inside the garden, so I think it is area.
- There is also a context clue about each seed needing one square foot in the garden, and I know we get square feet when we multiply feet x feet.

Great thinking! Now, before we start solving Part B, remember the question is asking us how many seeds the Bakers should buy. That clue about one seed needing one square foot in the garden is a big hint for us! **What do you think we need to do to solve Part B?** We have to find the area of the garden.

You are absolutely right. So let's find the area and how many seeds the Bakers will need, everybody work on your whiteboards or paper. So, what's the area of the Baker's garden? 21 square feet! But the question asks us how many seeds they should buy…21 seeds!

Let's Try it (Slides 10): You've done a lot of thinking and reasoning today so far about how we know when to solve for area and when to solve for perimeter. As we practice together, let's remember to always ask ourselves what the situation in the problem is telling us; is it telling us we need to cover something or is it

telling us to put something around something else? We have to think first, and then solve! If the problem doesn't give us a model, then we should draw one to help ourselves.

WARM WELCOME

Today we will find both the area and perimeter of rectangles depending on the context.

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Let's Review:

	Perimeter	Area
Definition		
Equation (for rectangles)		
Examples		

Let's Review:

	Perimeter	Area
Definition	The distance around the outside of a shape.	The space inside a shape, or what it covers
Equation (for rectangles)	Add all the side lengths ___ + ___ + ____ + ____	Multiply the sides ____ x ____
Examples	• Building a fence • Putting a border on something • Boundary lines of a sports field	• Tiling a floor • Painting a wall • Hanging a poster

Let's Talk: Perimeter or Area?

Painting lines around a field

Making a cage

Hanging a border

Building a fence

Sewing a tablecloth

Painting a wall

Pouring concrete for a sidewalk

Planting plants in a garden

Area	Perimeter

Let's Talk: Perimeter or Area?

Painting lines around a field

Making a cage

Hanging a border

Building a fence

Sewing a tablecloth

Painting a wall

Pouring concrete for a sidewalk

Planting plants in a garden

Area	Perimeter
Sewing a tablecloth Painting a wall Pouring concrete for a sidewalk Planting plants in a garden	Painting lines around a field Making a cage Building a fence Hanging a border

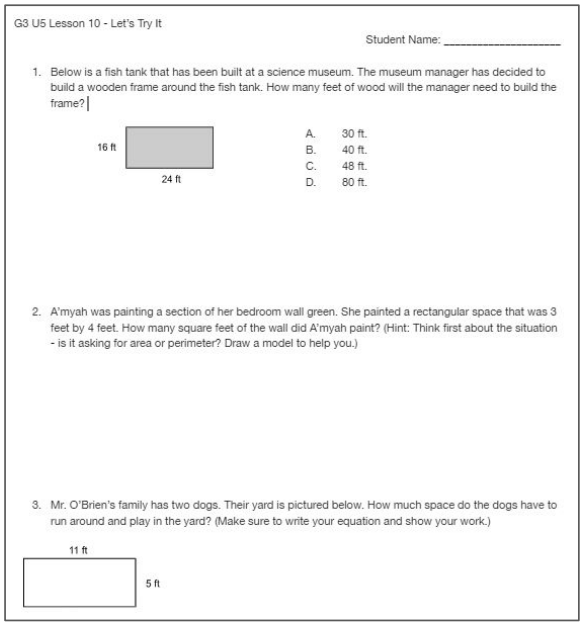
Let's Think:

Perimeter or Area? How do you know?

v

Let's Try It:

Let's apply our understanding together.



G3 U5 Lesson 10 - Let's Try It

Student Name: _____

1. Below is a fish tank that has been built at a science museum. The museum manager has decided to build a wooden frame around the fish tank. How many feet of wood will the manager need to build the frame?

A. 30 ft.
B. 40 ft.
C. 48 ft.
D. 80 ft.

2. A'myah was painting a section of her bedroom wall green. She painted a rectangular space that was 3 feet by 4 feet. How many square feet of the wall did A'myah paint? (Hint: Think first about the situation - is it asking for area or perimeter? Draw a model to help you.)

3. Mr. O'Brien's family has two dogs. Their yard is pictured below. How much space do the dogs have to run around and play in the yard? (Make sure to write your equation and show your work.)

On your Own: Let’s try on our own.

G3 U5 Lesson 10 - On Your Own

Student Name: _____

1. Which of the following situations would require you to find a perimeter? Select all that apply.

   a. Hanging lights around each corner of a room
   b. Designing the front cover of a new comic book
   c. Making a chalk outline of a hopscotch board
   d. Creating a poster to run for class president
   e. Building a frame for a piece of art

2. Ms. Walls bought a new carpet for her classroom. Her carpet is shown below. How much of her classroom floor will be covered by the carpet? Show your work to prove your answer.

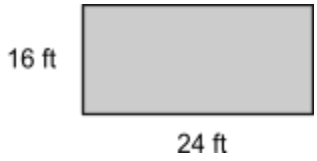
   A. 12 square feet
   B. 24 square feet
   C. 36 square feet
   D. 60 square feet

3. Some construction workers replaced 48 square feet of **flooring** in the cafeteria's kitchen. Which of the dimensions below could represent the section of floor that was replaced? Draw a model and show your work to support your answer.

   a. 12 ft x 12 ft
   b. 40 ft x 8 ft
   c. 8 ft x 6 ft
   d. 9 ft x 7 ft

Name: _____ G3 U5 Lesson 10 - Let's Try It

1. Below is a fish tank that has been built at a science museum. The museum manager has decided to build a wooden frame around the fish tank. How many feet of wood will the manager need to build the frame?



A. 30 ft.
B. 40 ft.
C. 48 ft.
D. 80 ft.

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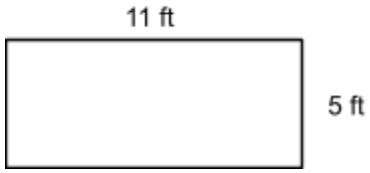
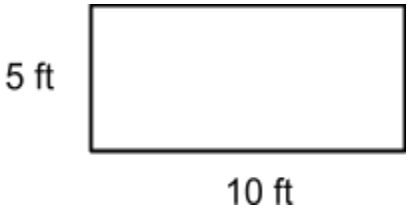
3. Mr. O'Brien's family has two dogs. Their yard is pictured below. How much space do the dogs have to run around and play in the yard? (Make sure to write your equation and show your work.)

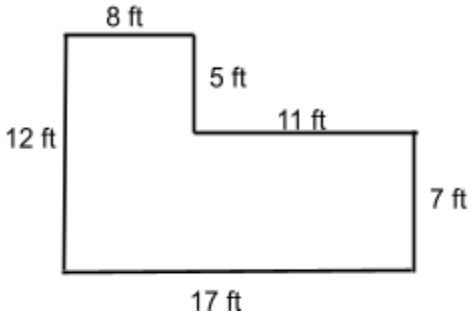


4. Queen was knitting a blanket, pictured below. She wants to put a lace border on the blanket. How many feet of border will Queen need to buy for the blanket?



5. There are two gardens behind our school. One garden is 8 feet by 4 feet and the other is 7 feet by 5 feet. Which garden would require more fencing? (Hint: Draw a model of both gardens. Do you need to find the area of each or the perimeter of each?)

6. A new stage is being built at an outdoor theater. The construction company is putting up a railing around the stage to keep the crowd back. How many feet of railing will the construction company need? (Write your equation and show your work.)

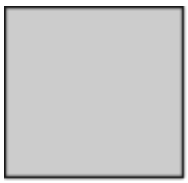


Name: _____ G3 U5 Lesson 10 - Independent Work

1. Which of the following situations would require you to find a perimeter? Select all that apply.

a. Hanging lights around each corner of a room
b. Designing the front cover of a new comic book
c. Making a chalk outline of a hopscotch board
d. Creating a poster to run for class president
e. Building a frame for a piece of art

2. Ms. Walls bought a new carpet for her classroom. Her carpet is shown below. How much of her classroom floor will be covered by the carpet? Show your work to prove your answer.



A. 12 square feet
B. 24 square feet
C. 36 square feet
D. 60 square feet

3. Some construction workers replaced 48 square feet of **flooring** in the cafeteria's kitchen. Which of the dimensions below could represent the section of floor that was replaced? Draw a model and show your work to support your answer.

a. 12 ft x 12 ft
b. 40 ft x 8 ft
c. 8 ft x 6 ft
d. 9 ft x 7 ft

4. The YMCA just built a new playground area for their after-school students. Their playground is 8 feet by 7 feet.

Part A: How many square feet of space will they need to cover with mulch?

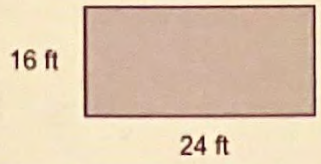
Part B: The employees at the YMCA also want to put a tall fence up around the playground to help keep the children safe. How many feet of fence do they need for the fence?

5. The Thompsons and the Whites both just got new puppies. The Thompsons built a pen in their backyard that is six feet by four feet for their puppy. The Whites also built a pen for their puppy but theirs is seven feet by five feet. Which family needed more feet of material to build their pen? Draw a model for each and write equations to prove your answer.

The _____ family needed more material to build the pen for their new puppy.

Student Name: Answer Key

1. Below is a fish tank that has been built at a science museum. The museum manager has decided to build a wooden frame around the fish tank. How many feet of wood will the manager need to build the frame?

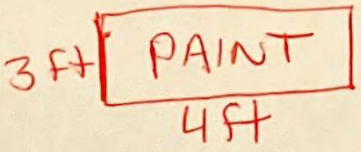


A. 30 ft.
B. 40 ft.
C. 48 ft.
D. 80 ft.

16 + 24 + 16 + 24 = ____

1
16 + 24 = 40
40 + 40 = 80

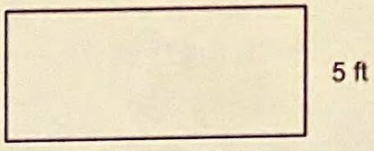
2. A'myah was painting a section of her bedroom wall green. She painted a rectangular space that was 3 feet by 4 feet. How many square feet of the wall did A'myah paint? (Hint: Think first about the situation - is it asking for area or perimeter? Draw a model to help you.)



3 × 4 = 12
12 square feet

3. Mr. O'Brien's family has two dogs. Their yard is pictured below. How much space do the dogs have to run around and play in the yard? (Make sure to write your equation and show your work.)

A = L × W
11 × 5 = 55 square feet



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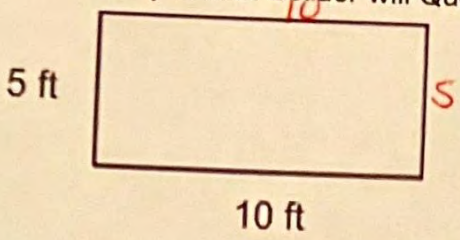
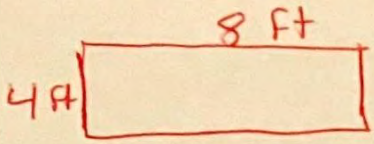
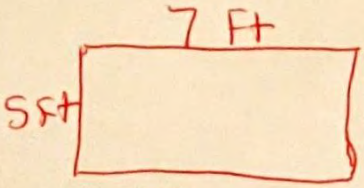


10+5+10+5 = 30 feet
30 feet of border

5. There are two gardens behind our school. One garden is 8 feet by 4 feet and the other is 7 feet by 5 feet. Which garden would require more fencing? (Hint: Draw a model of both gardens. Do you need to find the area of each or the perimeter of each?)



8+4+8+4 = ____
12 + 12 = 24
24 Feet

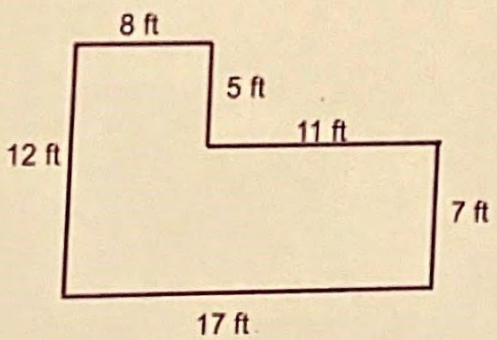


7+5+7+5= ____
12+12 =24
24 Feet

They will need the same amount of fencing

The garden that is _____ feet by _____ feet will require more fencing.

6. A new stage is being built at an outdoor theater. The construction company is putting up a railing around the stage to keep the crowd back. How many feet of railing will the construction company need? (Write your equation and show your work.)



8 +5+ 11 +7 + 17 + 12 = ____ ft
13+18 + 29

$$\begin{array}{r} {}^{2}13 \\ 18 \\ +\ 29 \\ \hline 60 \end{array}$$

60 Feet of railing

Student Name: Answer Key

1. Which of the following situations would require you to find a perimeter? Select all that apply.

a. Hanging lights around each corner of a room
b. Designing the front cover of a new comic book
c. Making a chalk outline of a hopscotch board
d. Creating a poster to run for class president
e. Building a frame for a piece of art

2. Ms. Walls bought a new carpet for her classroom. Her carpet is shown below. How much of her classroom floor will be covered by the carpet? Show your work to prove your answer.

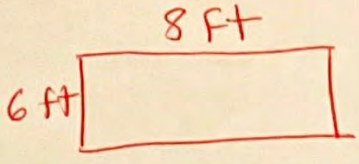
$A = L \times W$
$A = 6\,ft \times 6\,ft$
$A = 36\,ft^2$

A. 12 square feet
B. 24 square feet
C. 36 square feet
D. 60 square feet

3. Some construction workers replaced 48 square feet of **flooring** in the cafeteria's kitchen. Which of the dimensions below could represent the section of floor that was replaced? Draw a model and show your work to support your answer.

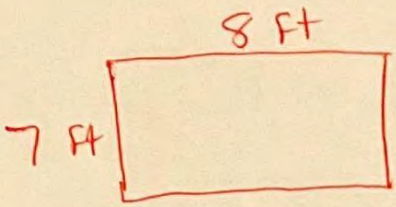
a. 12 ft x 12 ft
b. 40 ft x 8 ft
c. 8 ft x 6 ft
d. 9 ft x 7 ft

$L \times W = 48$ sq ft.
$8 \times 6 = 48$



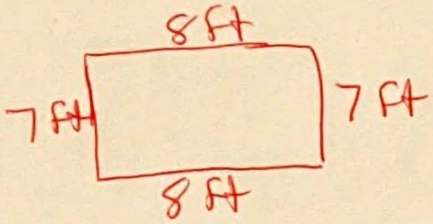
4. The YMCA just built a new playground area for their after-school students. Their playground is 8 feet by 7 feet.

Part A: How many square feet of space will they need to cover with mulch?



$A = L \times W$
$A = 8 \times 7$
$A = 56\ ft^2$

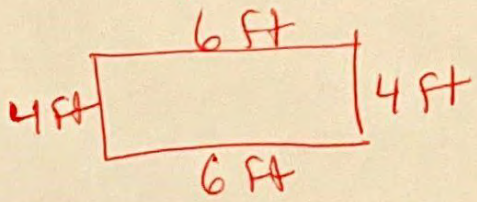
Part B: The employees at the YMCA also want to put a tall fence up around the playground to help keep the children safe. How many feet of fence do they need for the fence?



$8 + 7 + 8 + 7 =$ 30 feet
$15 + 15 = 30$

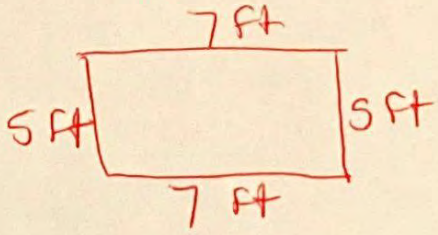
5. The Thompsons and the Whites both just got new puppies. The Thompsons built a pen in their backyard that is six feet by four feet for their puppy. The Whites also built a pen for their puppy but theirs is seven feet by five feet. Which family needed more feet of material to build their pen? Draw a model for each and write equations to prove your answer.

T



$6 + 4 + 6 + 4 = 20$ ft

W



$7 + 5 + 7 + 5 = 24$ ft
12 12

The White **family needed more material to build the pen for their new puppy.**