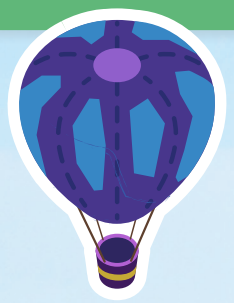


Unit 7

Two-Dimensional Shapes and Perimeter

Essential Questions

- How can a shape have more than 1 name?
- What does perimeter tell you about a shape?
- How do a shape's attributes relate to its perimeter and area?

Unit Story: Through Piho's Eyes

You can read the Unit Story with your student by visiting the Unit Story page on the Caregiver Hub.

Christopher Wood/Shutterstock.com

Unit Investigation

Lesson 1 is the Unit Investigation. Students describe and sort two-dimensional shapes, or flat shapes, based on their attributes to build curiosity and apply their own knowledge in a variety of ways. Use the **Caregiver Connection** to help students continue to explore the math they will see in the unit.

Caregiver Connection

Students may enjoy sorting flat objects into categories at home, such as envelopes, paper plates, coasters, etc.

You can ask:

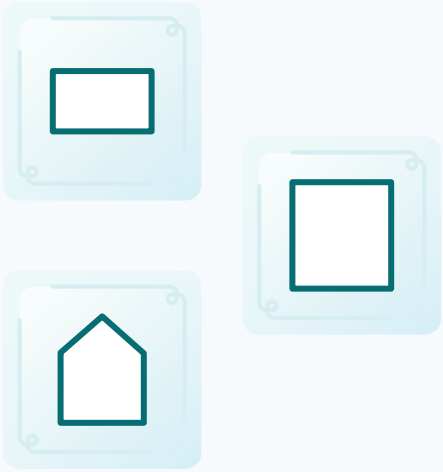
- "How did you decide to categorize these shapes together?"
- "What attributes (or characteristics) do they have in common?"

Summary | Lesson 2

Different shapes can share some of the same attributes. Using precise language can help you describe the defining attributes of shapes.

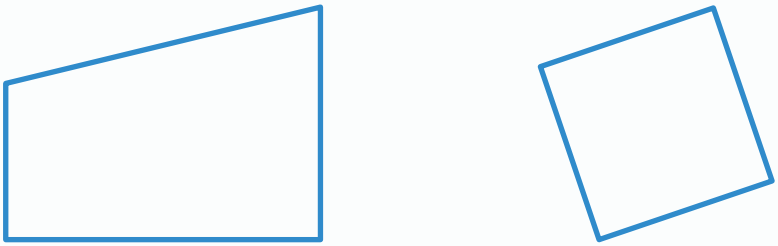
more than 3 sides

some square corners



Try This

1 Here are 2 quadrilaterals.



Select *all* the attributes that the quadrilaterals share.

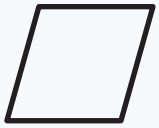
- (A) 4 square corners
- (B) 4 sides
- (C) 3 square corners
- (D) 4 corners
- (E) 2 opposite side lengths that are the same length.

Summary | Lesson 3

Rectangles, squares, and **rhombuses** are all quadrilaterals with shared attributes and defining attributes that make them unique.

- 4 straight sides
- 4 square corners

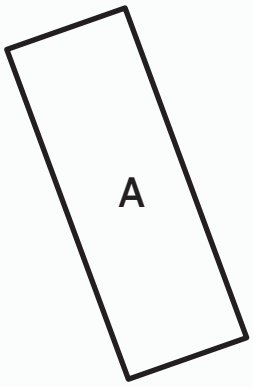
- 4 straight sides
- 4 square corners
- All sides are the same length

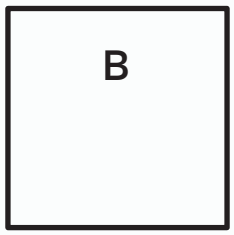


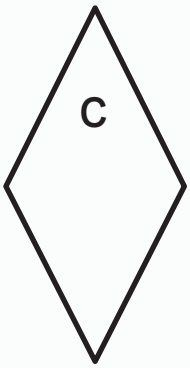
- 4 straight sides
- All sides are the same length

Try This

1 Here are Quadrilaterals A–E. Circle *all* the rectangles. Draw an X on *all* the squares. Draw a star on *all* the rhombuses.

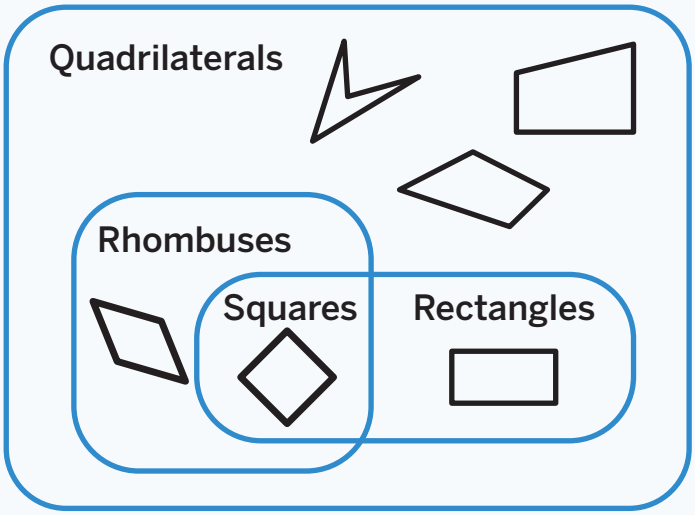






Summary | Lesson 4

Shapes can belong in different categories because of their shared attributes. The defining attributes of shapes can be helpful in creating examples and non-examples of shapes and in calling them by their most precise name.



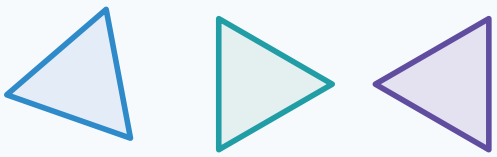
Try This

1 Why can some quadrilaterals be called by more than 1 name?

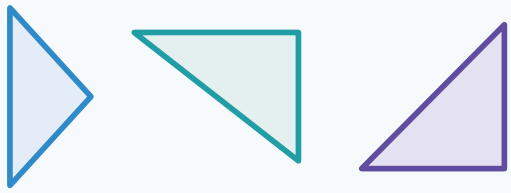
Summary | Lesson 5

Shapes in the same category can look different and have different attributes.

Triangles with 3 equal side lengths



Triangles with 1 square corner



Try This

Use the image for Problems 1 and 2.

"African Bricks In Kaleidoscope" by Piotr Siedlecki via PublicDomainPictures.net. CCO 1.0.

1. Circle 1 rhombus in the pattern.

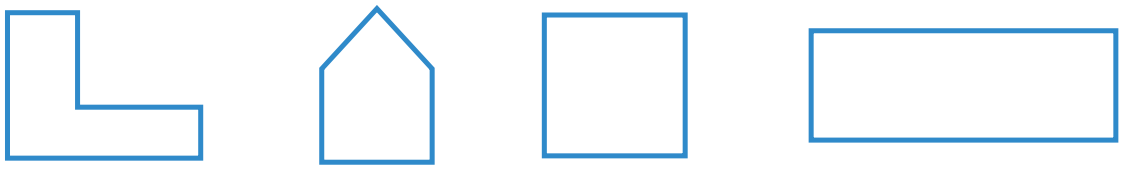
2. Draw a box around 1 quadrilateral in the pattern that is *not* a rhombus. Explain how you know it is not a rhombus.

Sub-Unit 1 | Summary

In this sub-unit . . .

- We described, compared, and categorized shapes based on their shared and defining attributes.

  Shapes with square corners and more than 3 sides

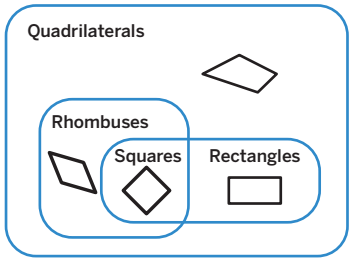


  Math tip: Shapes in different categories can share attributes. When describing a specific shape, it is helpful to use a shape's defining attributes.

- We defined rectangles, squares, and **rhombuses** and drew examples and non-examples of these shapes.

Rectangle	Square	Rhombus
• quadrilateral • 4 square corners • 2 pairs of opposite sides are equal length.	• quadrilateral • 4 square corners • 4 equal-length sides	• quadrilateral • 4 equal-length sides

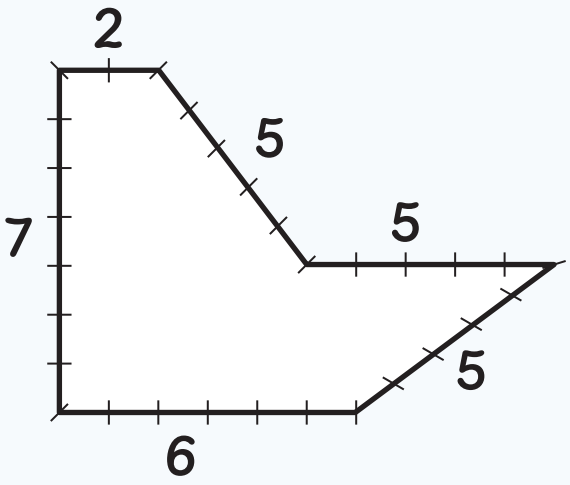
- We categorized quadrilaterals based on their attributes.



  Math tip: Shapes can belong in different categories because of their shared attributes. When describing a specific shape, it is helpful to use a shape's most precise name.

Summary | Lesson 6

Perimeter is the total length of the boundary of a two-dimensional shape. You can measure perimeter by counting or calculating the total length of all the sides of a shape.



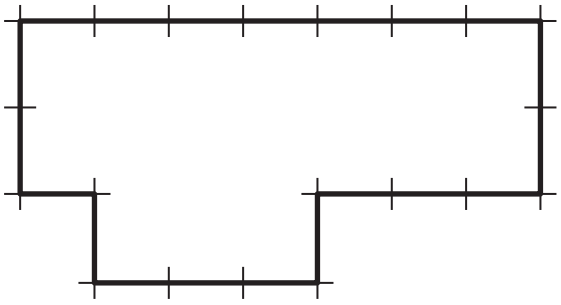
5 + 5 + 5 + 2 + 7 + 6 = 30,
so 30 units

Try This

Determine the perimeter of the shape. The distance between 2 tick marks is 1 unit.

Show or explain your thinking.

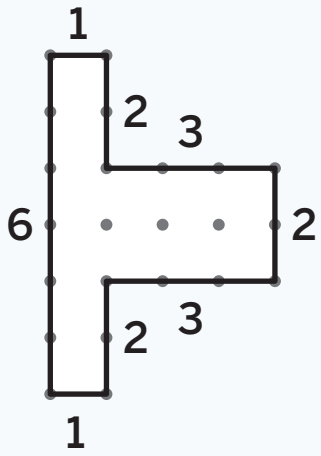
1



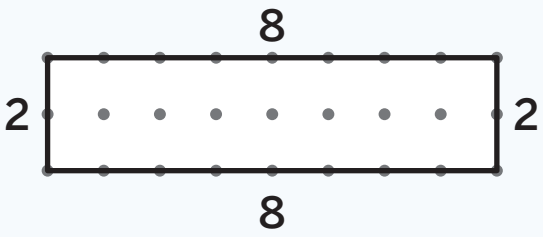
answer: _____

Summary | Lesson 7

2 shapes that look different can have the same perimeter if the total length of their sides is the same.



1 + 1 + 2 + 2 + 2 + 3 + 3 + 6 = 20 units



8 + 8 + 2 + 2 = 20 units

Try This

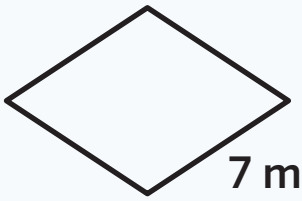
1 Draw 2 different shapes with a perimeter of 18 units.

Draw

Summary | Lesson 8

You can use what you know about a shape's attributes to determine unknown side lengths. You can use multiplication to calculate the perimeter by grouping sides with the same length.

rhombus



A rhombus has 4 equal sides.
So, each side is 7 meters long.

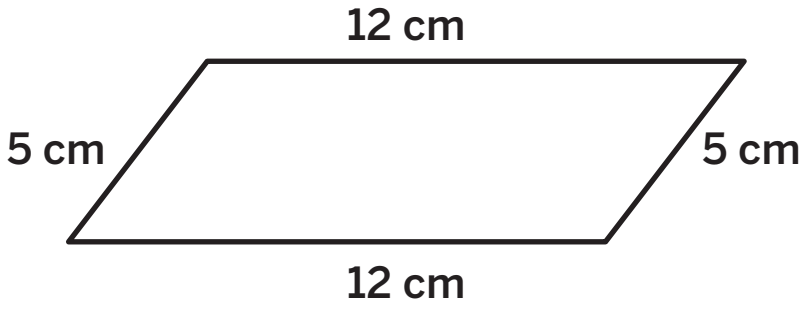
$4 \times 7 = 28$
The perimeter is 28 meters.

Try This

Determine the perimeter of the shape.

Show your thinking.

1

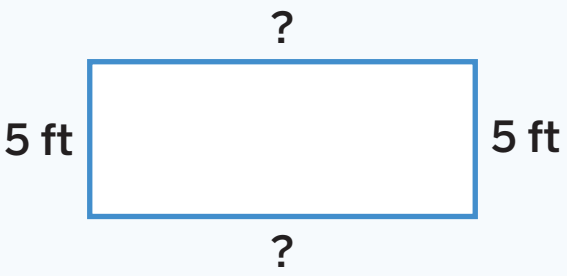


answer: _____

Summary | Lesson 9

You can determine a shape's unknown side lengths if you know the perimeter, some of the side lengths, and the shape's defining attributes.

The perimeter of the rectangle is 24 feet.



$2 \times 5 = 10$

$24 - 10 = 14$

$2 \times ? = 14$

$? = 7$

Try This

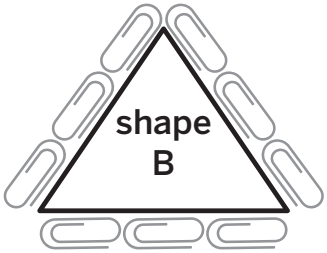
1 Priya has a square flower garden in her yard. The border around the garden is 32 feet long. How long is each side of Priya's flower garden?

Show or explain your thinking.

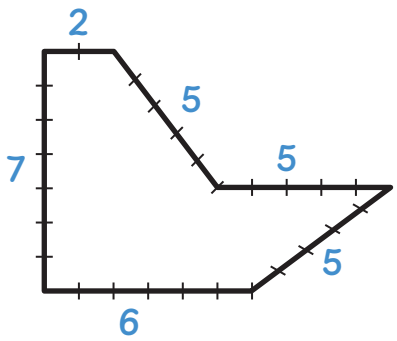
answer: _____

In this sub-unit . . .

- We measured the **perimeter** of different shapes using paper clips.



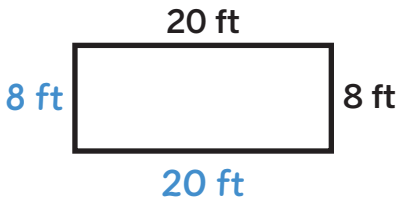
- We determined the perimeter of shapes when given all the side lengths.



5 + 5 + 5 + 6 + 7 + 2 = 30
The perimeter is 30 units.

Math tip: Shapes that look different can have the same perimeter.

- We determined the perimeter of familiar shapes when given some of the side lengths.



This is a rectangle, so the sides across from one another are equal.
8 + 8 + 20 + 20
16 + 40
56
The perimeter is 56 feet.

Math tip: You can use what you know about the attributes of a shape to determine the unknown side lengths and calculate the perimeter.

Summary | Lesson 10

Perimeter and area are measurable attributes of rectangles.
Perimeter is the total length of the boundary of a rectangle.
Area is the number of square units that cover a rectangle.

A shop owner is hanging lights around the front window of her store.

The total amount of glass covering the window represents the **area** of the window.

$5 \times 5 = 25$ square feet

laura.h/Shutterstock.com

The total length of hanging lights represents the **perimeter** of the window.

$5 + 5 + 5 + 5 = 20$ feet

Try This

1 Select *all* the expressions that could represent the area of a garden that measures 36 square feet.

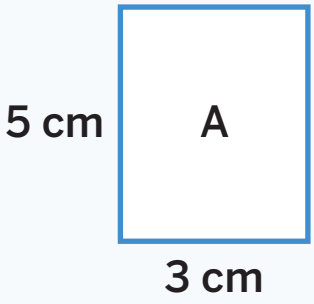
- **A** 9×4
- **B** $6 + 6 + 6 + 6$
- **C** $(9 \times 2) + (4 \times 2)$
- **D** 6×6
- **E** 6×9
- **F** 2×18

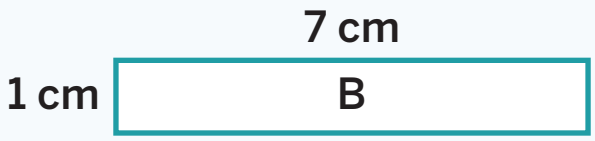
2 A bedroom has a length of 14 feet and a width of 12 feet. Select *all* the expressions that could represent the perimeter of the bedroom.

- **A** 12×14
- **B** $12 + 12 + 14 + 14$
- **C** $(12 \times 2) + (14 \times 2)$
- **D** $(2 \times 7) + (2 \times 6)$
- **E** $12 + 14$
- **F** $(2 \times 14) + (2 \times 12)$

Summary | Lesson 11

Rectangles with the same perimeter can have different areas.





Rectangle A and Rectangle B perimeter: 16 cm
Rectangle A area: 15 sq. cm
Rectangle B area: 7 sq. cm

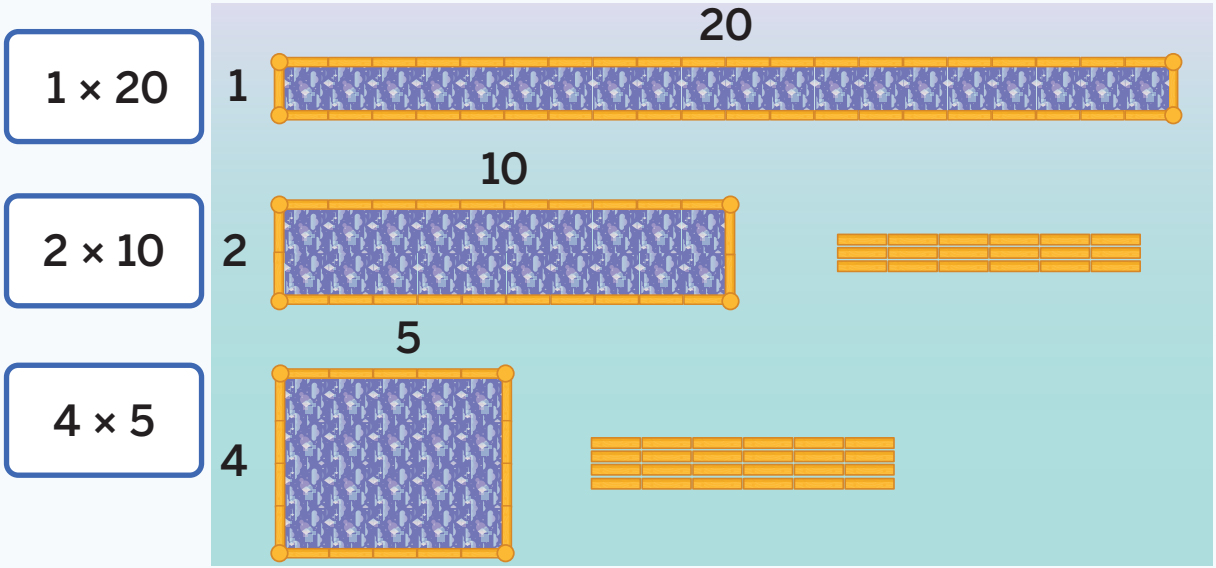
Try This

1 Draw 2 rectangles with a perimeter of 24 units but different areas.

Draw

Summary | Lesson 12

Rectangles with the same area can have different perimeters.



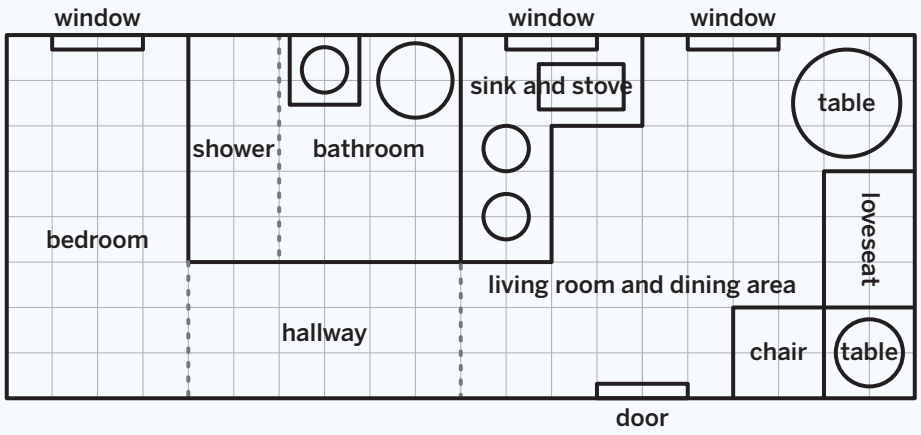
Try This

1 Draw 2 rectangles that have an area of 36 square units and different perimeters.

Draw

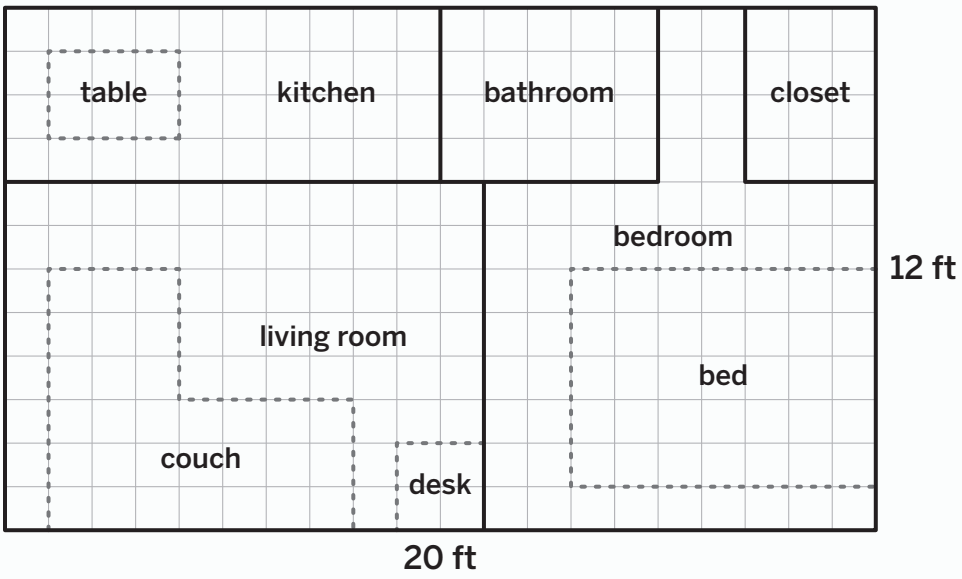
Summary | Lesson 13

Perimeter and area are important measurements to consider when designing spaces.



Try This

Use the design of the tiny house for Problem 1.



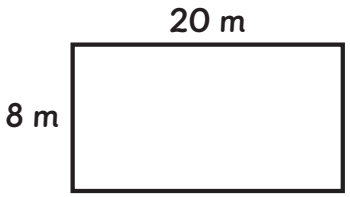
1 Record the perimeter and area of each feature.

Feature	Perimeter	Area
table		
kitchen		
couch		

In this sub-unit . . .

- We represented and solved story problems about area and perimeter.

  A sculpture sat on a rectangular stone surrounded by a rope barrier. 2 sides of the stone measured 20 meters and 8 meters.



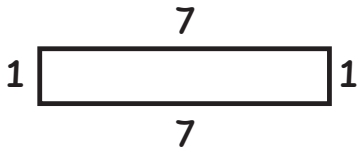
What is the total length of the rope barrier?

(20 × 2) + (8 × 2)
40 + 16 = 56
The perimeter is 56 meters.

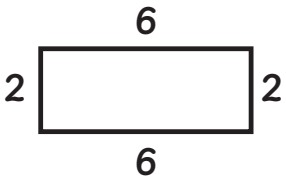
What is the area of the rectangular stone?

8 × 20
8 × 2 × 10
16 × 10 = 160
The area is 160 square meters.

- We created rectangles with the same perimeter but different areas.

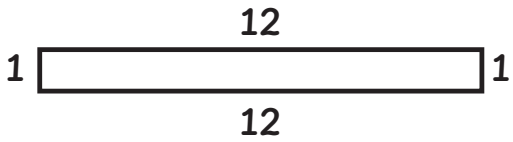


area: 7 square units
perimeter: 16 units

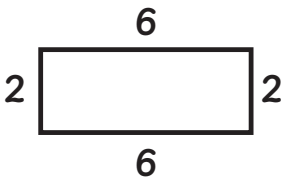


area: 12 square units
perimeter: 16 units

- We created rectangles with the same area but different perimeters.



area: 12 square units
perimeter: 26 units



area: 12 square units
perimeter: 16 units

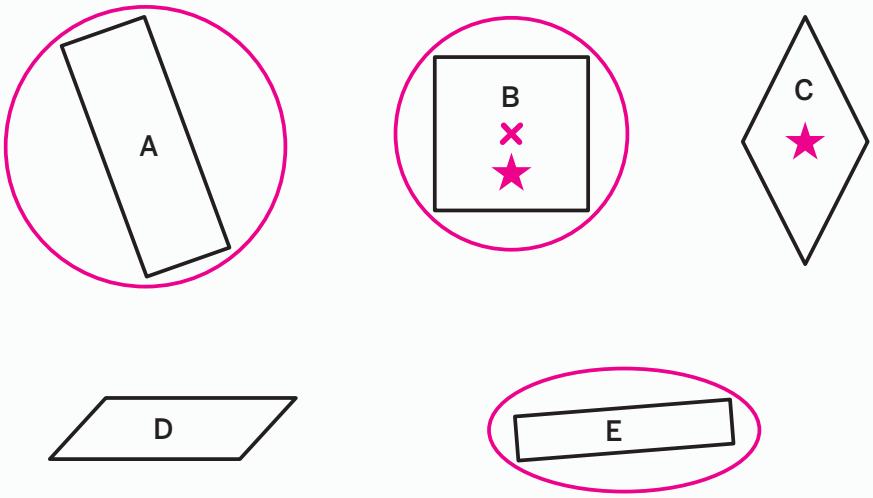
Math tip: You can use known multiplication facts to create rectangles with the same area but different perimeters.

Lesson 2

1 B and D

Lesson 3

1



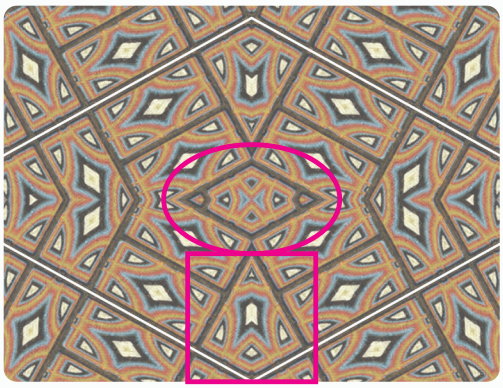
Lesson 4

1 Sample response shown.
Some quadrilaterals have equal sides or all square corners, so they can also be called a more specific name.

Lesson 5

Sample responses shown.

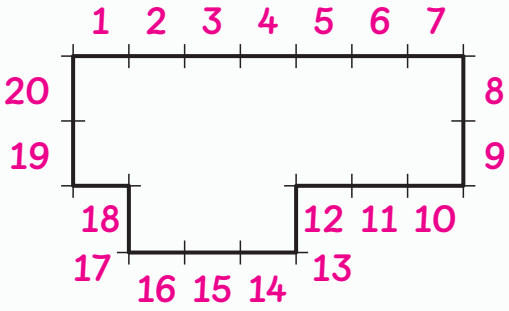
1–2



The quadrilateral right below the rhombus is not a rhombus because all 4 sides are not the same length.

Lesson 6

1 Sample work shown.

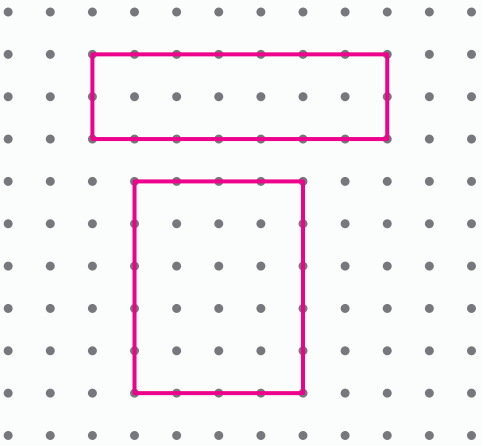


I counted the spaces between the tick marks.

answer: 20 units

Lesson 7

1 Sample response shown.



Lesson 8

1 Sample work shown.

$5 \times 2 + 12 \times 2$

$10 + 24 = 34$

answer: 34 centimeters

Lesson 9

1 Sample work shown.

The flower garden is a square, so all 4 sides are equal.

Each side is 8 feet long because $4 \times 8 = 32$.

answer: 8 feet

Try This | Answer Key

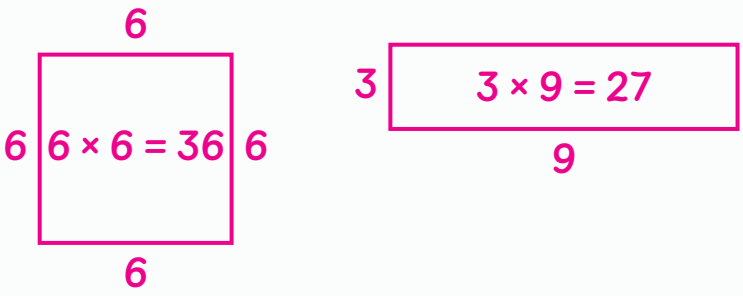
Lesson 10

1 A, D, and F

2 B, C, and F

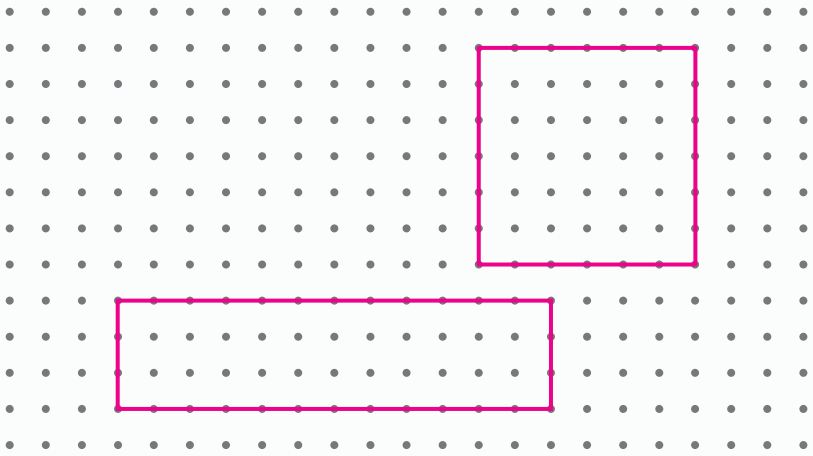
Lesson 11

1 Sample response shown.



Lesson 12

1 Sample response shown.

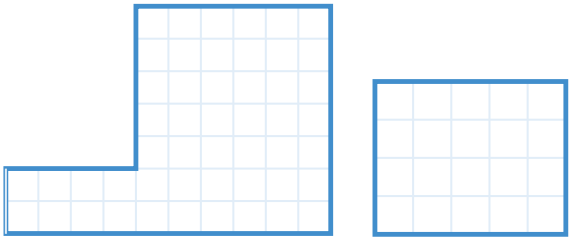
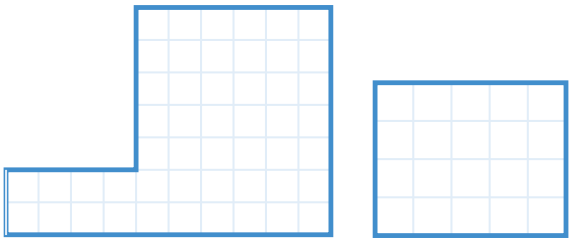
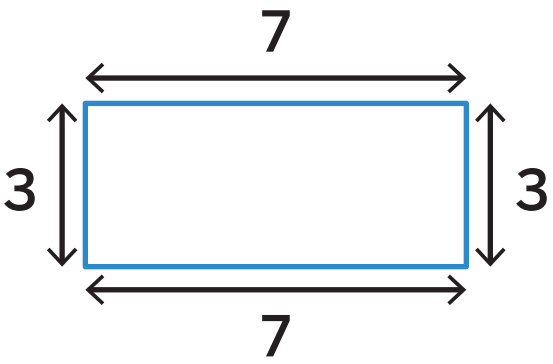
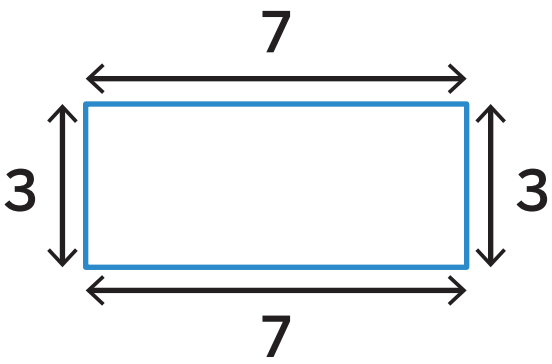


Lesson 13

1

Feature	Perimeter	Area
table	10 ft	6 sq. ft
kitchen	28 ft	40 sq. ft
couch	26 ft	30 sq. ft

Grade 3 Unit 7 Glossary/3.er grado Unidad 7 Glosario

English	Español
A	
area A measurement of the space inside a two-dimensional shape. (Shown here as the number of square units that cover the shape without gaps or overlaps.)	**área** Una medida del espacio dentro de una figura bidimensional. (Aquí se muestra como el número de unidades cuadradas que cubren la figura sin espacios ni superposiciones).
	
attribute A feature or trait that describes an object or set of objects.	**atributo** Característica o rasgo que describe un objeto o conjunto de objetos.
P	
perimeter The total length of the boundary of a two-dimensional shape.	**perímetro** La longitud total del contorno de una figura bidimensional.
	

English

Español

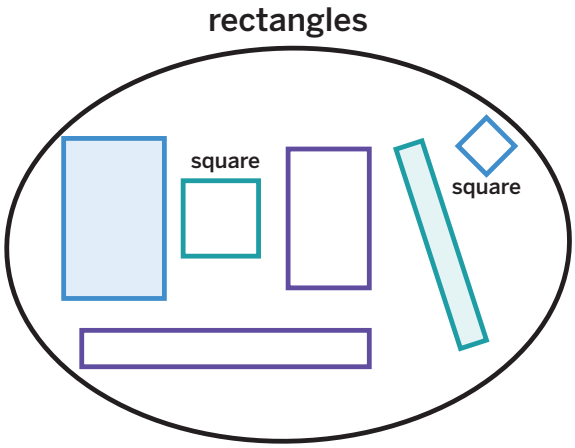
Q

quadrilateral A shape with 4 sides and 4 corners.

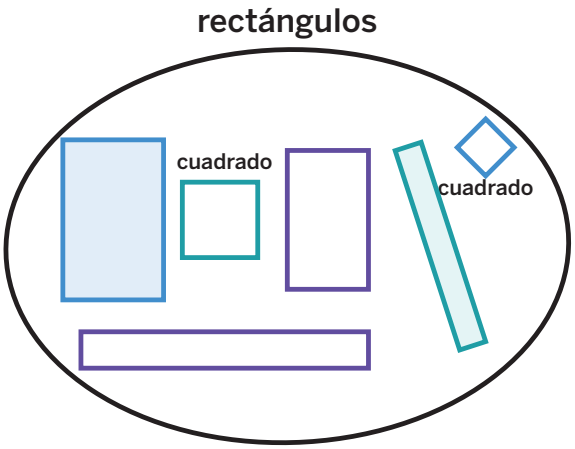
cuadrilátero Una figura con 4 lados y 4 esquinas.

R

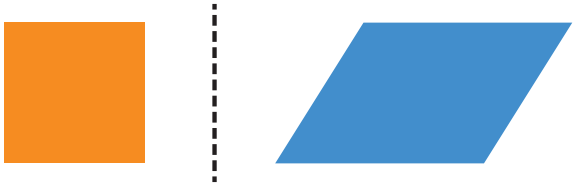
rectangle A quadrilateral that has 2 pairs of opposite sides that are the same length and 4 square corners.



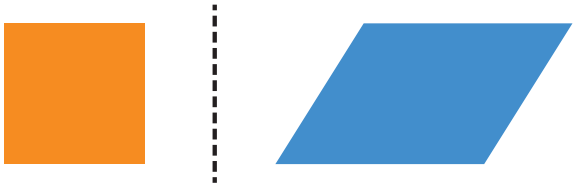
rectángulo Un cuadrilátero que tiene 2 pares de lados opuestos de la misma longitud y 4 esquinas de ángulo recto.



rhombus A quadrilateral with 4 equal sides and 4 corners. The corners do not need to be square corners. A square is a kind of rhombus.



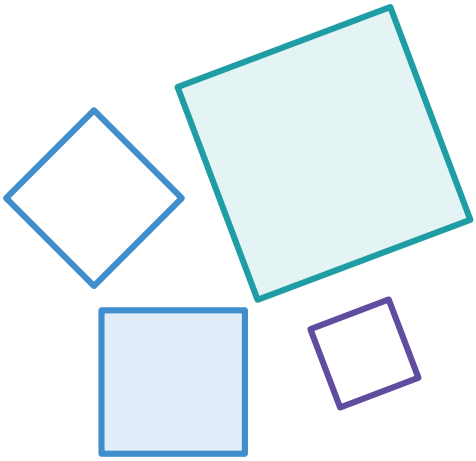
rombo Un cuadrilátero con 4 lados iguales y 4 esquinas. No es necesario que las esquinas sean ángulos rectos. Un cuadrado es un tipo de rombo.



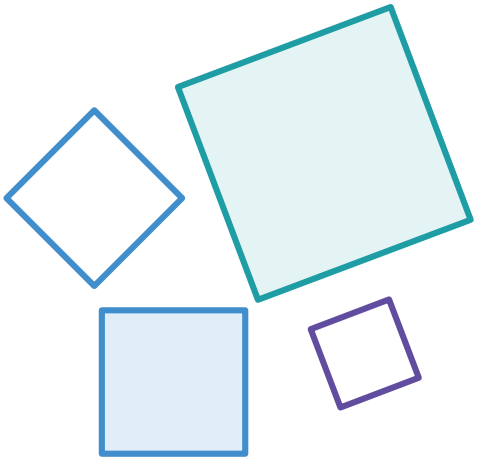
English	Español

S

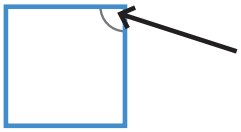
square A quadrilateral that has sides that are all the same length and 4 square corners.



cuadrado Un cuadrilátero que tiene todos sus lados del mismo largo y 4 esquinas de ángulo recto.



square corner A corner that looks like the place where 2 sides of a square touch.



esquina de ángulo recto Una esquina en la que aparentemente se encuentran 2 lados de un cuadrado.