English Spanish

6.2 Perimeters of Composite Figures

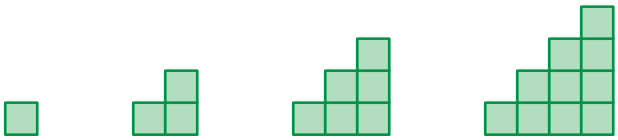
Essential Question How can you find the perimeter of a composite figure?

1 ACTIVITY: Finding a Pattern

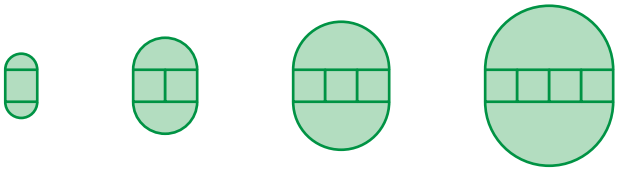
Work with a partner. Describe the pattern of the perimeters. Use your pattern to find the perimeter of the tenth figure in the sequence. (Each small square has a perimeter of 4.)

a.

b.



c.

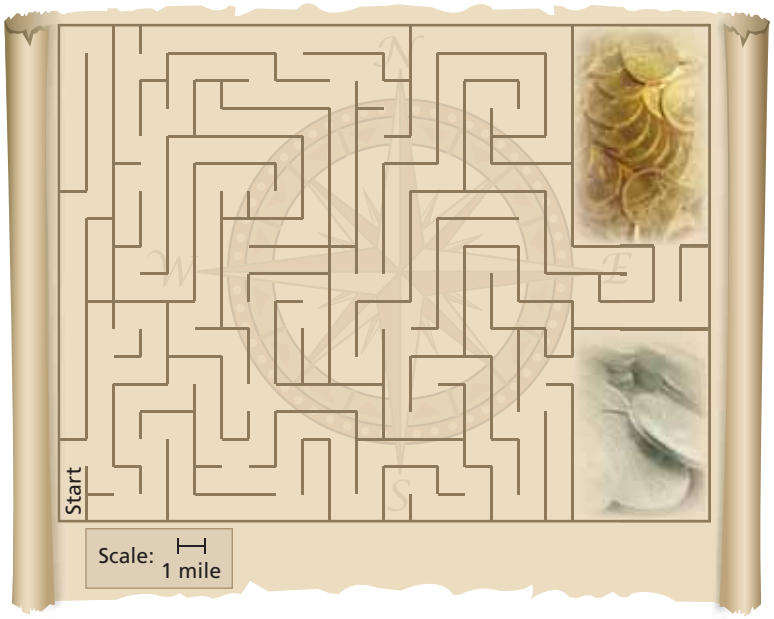


2 ACTIVITY: Finding a Distance

Work with a partner.

a. Estimate the distance to the gold.

b. Estimate the distance to the silver.



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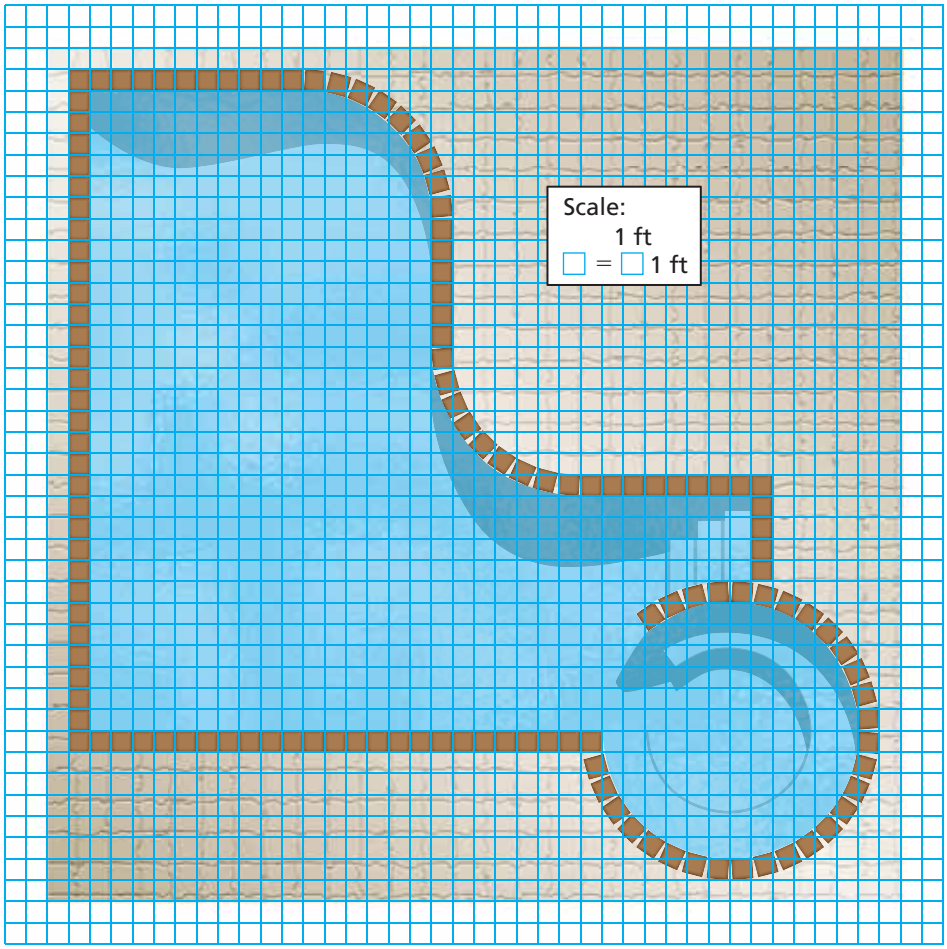
3 ACTIVITY: Submitting a Bid

Work with a partner. You want to bid on a tiling contract. You will be supplying and installing the brown tile that borders the swimming pool.

- **Your cost for the tile is $4 per linear foot.**
- **It takes about 15 minutes to prepare, install, and clean each foot of tile.**

a. How many brown tiles are needed for the border?

b. Write a bid for how much you will charge to supply and install the tile. Include what you want to charge as an hourly wage. Estimate what you think your profit will be.



What Is Your Answer?

4. **IN YOUR OWN WORDS** How can you find the perimeter of a composite figure? Use a semicircle, a triangle, and a parallelogram to draw a composite figure. Label the dimensions. Find the perimeter of the figure.

Practice Use what you learned about perimeters of composite figures to complete Exercises 3–5 on page 250.

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6.2 Lesson

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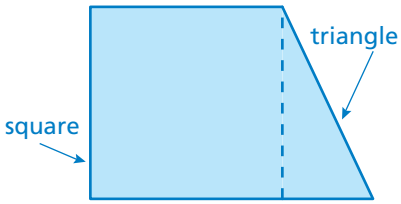
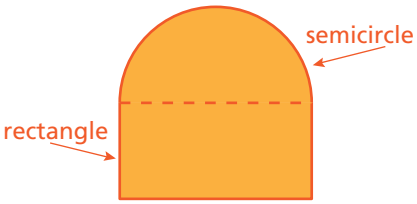
Key Vocabulary
composite figure, *p. 248*

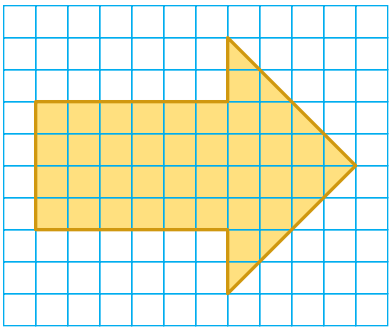
A **composite figure** is made up of triangles, squares, rectangles, semicircles, and other two-dimensional figures. Here are two examples.



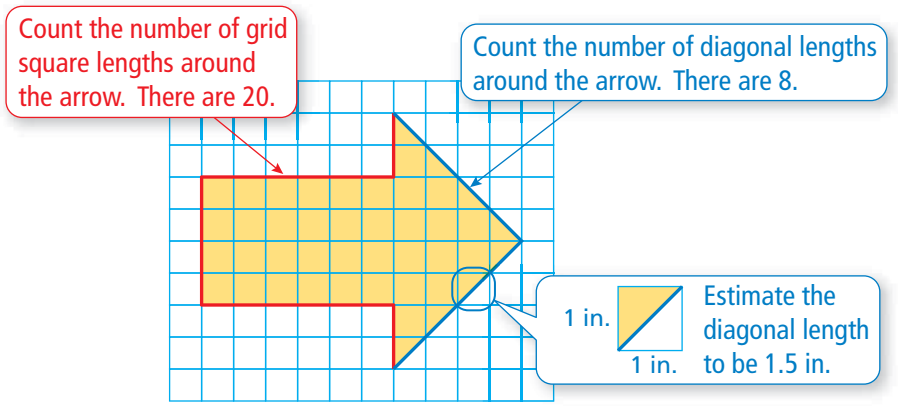


To find the perimeter of a composite figure, find the distance around the figure.

EXAMPLE 1 Finding a Perimeter Using Grid Paper



Each square on the grid paper is 1 square inch. Estimate the perimeter of the arrow.



Length of 20 grid square lengths: $20 \times 1 = 20$ inches

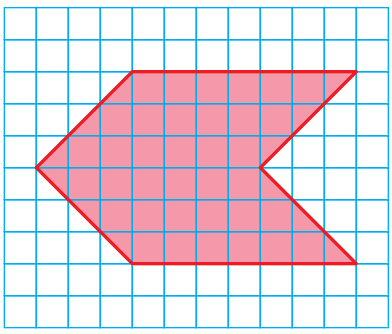
Length of 8 diagonal lengths: $8 \times 1.5 = 12$ inches

∴ The perimeter is about $20 + 12 = 32$ inches.

On Your Own

Now You're Ready
Exercises 3–8

1. Each square on the grid paper is 1 square foot. Estimate the perimeter of the red figure.
2. Measure the diagonal of a square whose area is exactly one square foot. Is the diagonal length closer to 1.5 feet or 1.4 feet? Explain.



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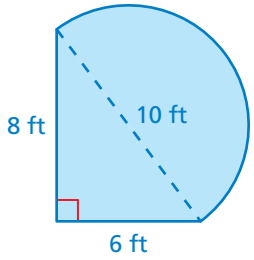
EXAMPLE 2 Finding a Perimeter



The figure is made up of a semicircle and a triangle. Find the perimeter.

The distance around the triangular part of the figure is $6 + 8 = 14$ feet.

The distance around the semicircle is one-half the circumference of a circle with a diameter of 10 feet.

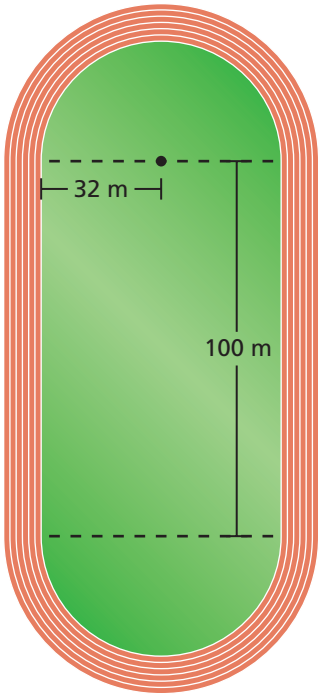
$$\frac{C}{2} = \frac{\pi d}{2}$$ Divide the circumference by 2.

$$\approx \frac{3.14 \cdot 10}{2}$$ Substitute 3.14 for π and 10 for d.

$$= 15.7$$ Simplify.

∴ The perimeter is about $14 + 15.7 = 29.7$ feet.

EXAMPLE 3 Finding a Perimeter



The running track is made up of a rectangle and two semicircles. Find the perimeter.

The semicircular ends of the track form a circle with a radius of 32 meters. Find its circumference.

$$C = 2\pi r$$ Write formula for circumference.

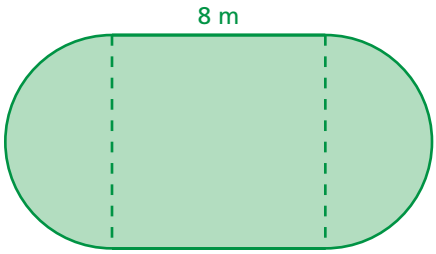
$$\approx 2 \cdot 3.14 \cdot 32$$ Substitute 3.14 for π and 32 for r.

$$= 200.96$$ Multiply.

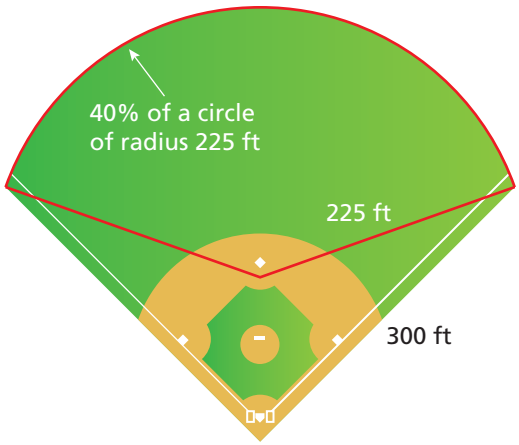
∴ The perimeter is about $100 + 100 + 200.96 = 400.96$ meters.

On Your Own

3. The figure is made up of a square and two semicircles. Find the perimeter.



4. Running at 4 ft/sec, how long would it take a person to run around the baseball field?



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6.2 Exercises

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Vocabulary and Concept Check

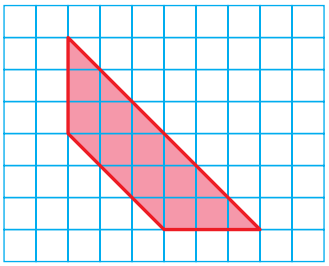
1. **NUMBER SENSE** Is the perimeter of a composite figure *greater than*, *less than*, or *equal to* the sum of the perimeters of each figure separately? Explain.

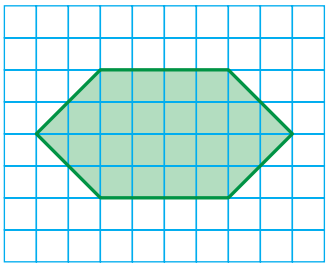
2. **OPEN-ENDED** Draw a composite figure formed by a parallelogram and a trapezoid.

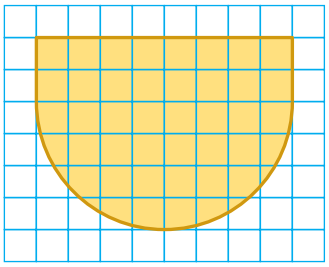
Practice and Problem Solving

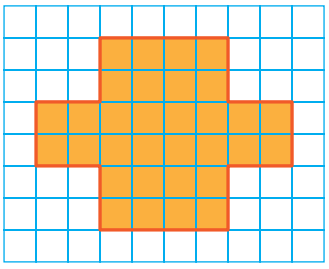
Each square on the grid paper is 1 square inch. Estimate the perimeter of the figure.

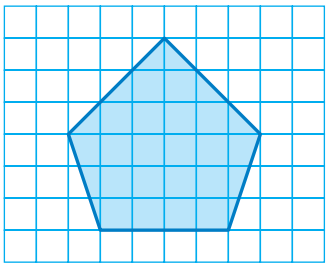
1

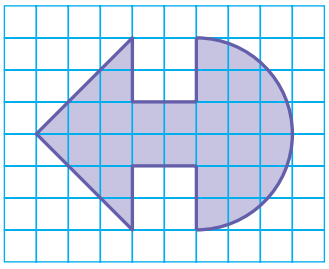
3. 

4. 

5. 

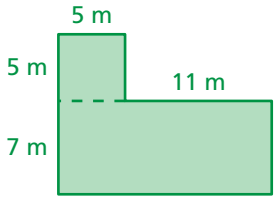
6. 

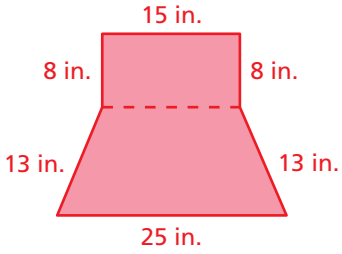
7. 

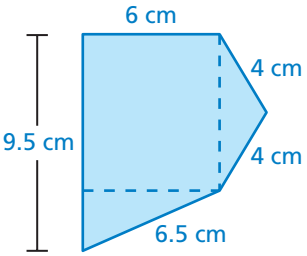
8. 

Find the perimeter of the figure.

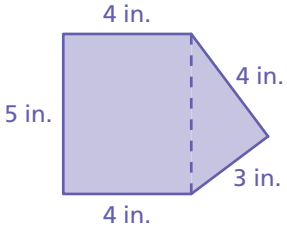
2

9. 

10. 

11. 

12. **ERROR ANALYSIS** Describe and correct the error in finding the perimeter of the figure.



✗ Perimeter = 4 + 3 + 4 + 5 + 4 + 5
= 25 in.

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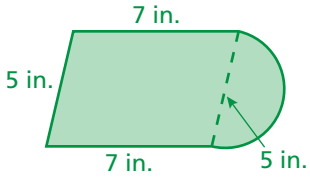
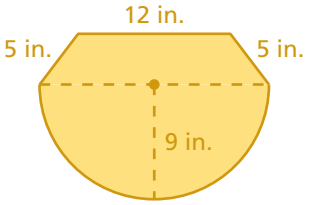
Find the perimeter of the figure.

13.



14.



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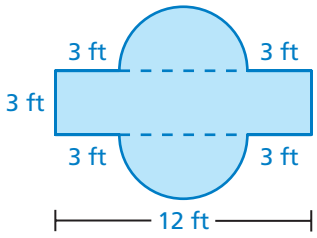
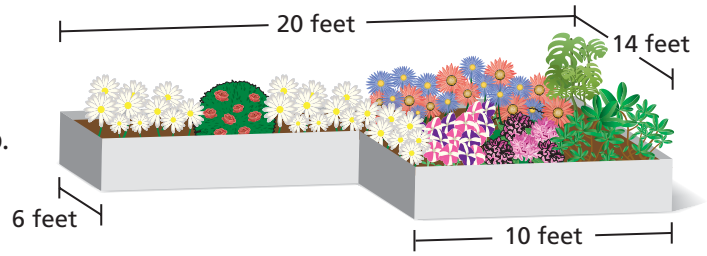


16. PASTURE A section of land is to be fenced in for a horse pasture.

a. Find the perimeter of the pasture.

b. Fencing costs $27 per yard. How much will it cost to fence in the pasture?



17. GARDEN A garden is built on a rooftop.

a. Find the perimeter of the garden.

b. You want to increase the perimeter by 15 feet. Draw a diagram of how you would do this. Is there more than one way? Explain.

18. In Example 3 on page 249, the track has six lanes. Explain why the starting points for the six runners are staggered. Draw a diagram as part of your explanation.

19. Critical Thinking Is it possible to add a figure to a composite figure without increasing its perimeter? Explain and draw a diagram to support your answer.

Fair Game Review What you learned in previous grades & lessons

Evaluate the expression. SECTION 3.2

20. $2.15(3)^2$ **21.** $4.37(8)^2$ **22.** $3.14(7)^2$ **23.** $8.2(5)^2$

24. MULTIPLE CHOICE Which expression represents "6 less than 5 times a number x?" SECTION 1.2

(A) $(6 - 5)x$ (B) $6 - 5x$ (C) $\frac{6}{5x}$ (D) $5x - 6$