# 6.7 Exercises

## Concept Check

**Fill-in-the-Blank.** Complete each sentence using information found in this section.

1. When measuring area use _____ units.
2. The measure of the interior of a plane figure is the _____ of the figure.
3. $A = bh$ is the formula for the area of a/an _____.
4. The $b$ in area formulas represents the figure's _____.
5. $A = s^2$ is the formula for the area of a/an _____.
6. $A = \frac{1}{2}bh$ is the formula for the area of a/an _____.

**True/False.** Determine whether each statement is true of false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

7. The $(b+c)$ in the trapezoid area formula represents the sum of the lengths of the base and the corners.
8. The height of a triangle is the distance between the base and the vertex opposite the base.
9. The area formula for a triangle is $A = a + b + c$.
10. The area formula for a trapezoid is $A = \frac{1}{2}h(b+c)$.

## Practice

Calculate the area of each figure described. Use $\pi \approx 3.14$. See Examples 1 through 3.

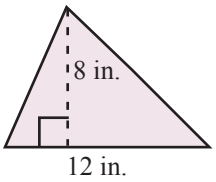
1. A square with sides of length 9 ft.
2. A square with sides of length 6 in.
3. A rectangle with length 21 km and width 25 km.
4. A rectangle with length $1\frac{1}{4}$ mi and width $2\frac{1}{2}$ mi.
5. A parallelogram with height 2.3 ft and base 11.9 ft.
6. A parallelogram with height 5 m and base 12 m.
7. A triangle with height $\frac{8}{9}$ in. and base $\frac{5}{12}$ in.
8. A triangle with height 16.4 cm and base 8.2 cm.
9. A trapezoid with height 10 cm and parallel sides of length 15 cm and 18 cm.
10. A trapezoid with height 30 mm and parallel sides of length 45 mm and 50 mm.

**11.** A circle with radius $\frac{3}{4}$ ft.

**12.** A circle with radius $12\frac{1}{5}$ mi.

Calculate the area of each figure. Use $\pi \approx 3.14$. See Examples 1 through 7.

**13.**

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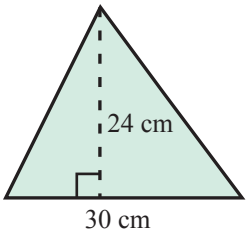


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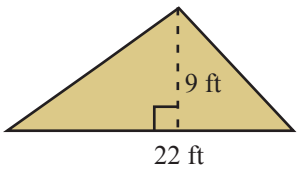


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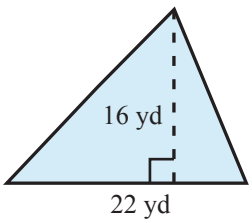


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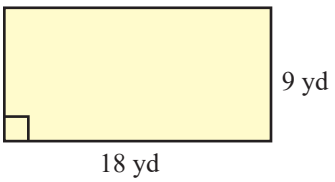


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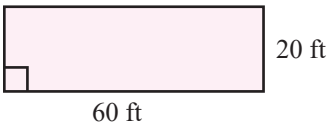


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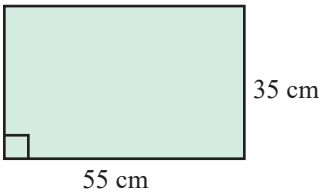


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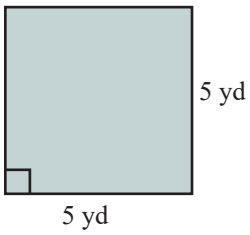


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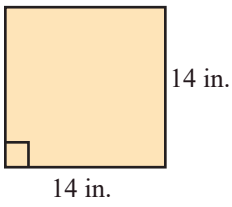


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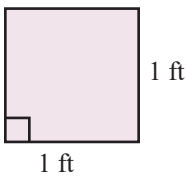


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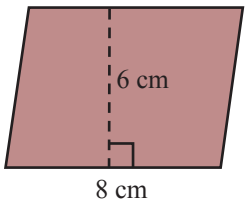


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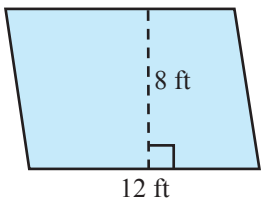


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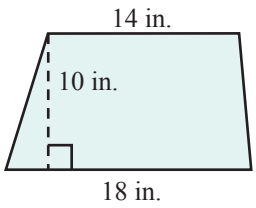

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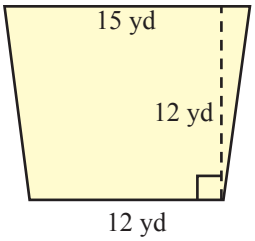


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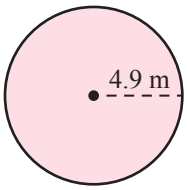


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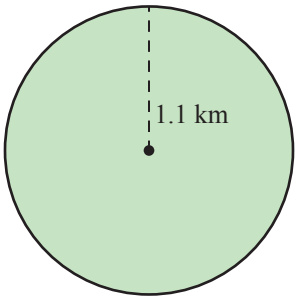


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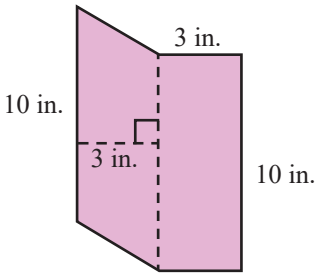


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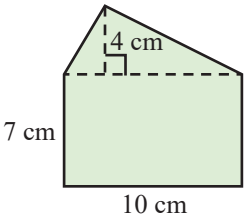


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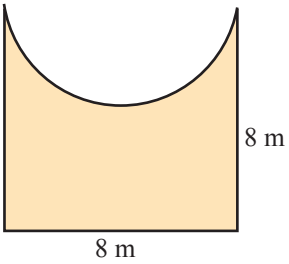


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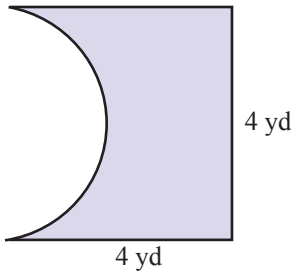


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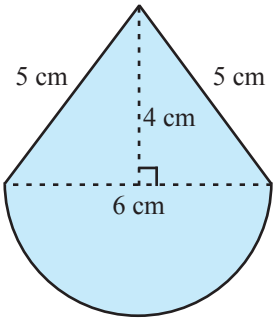


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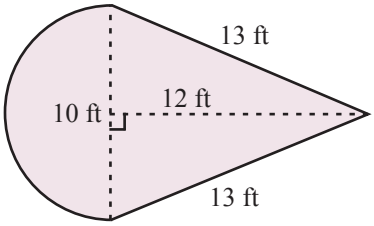


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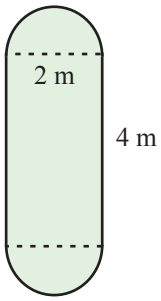


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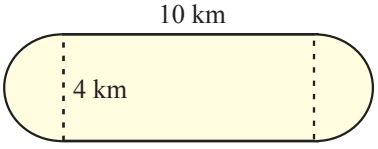


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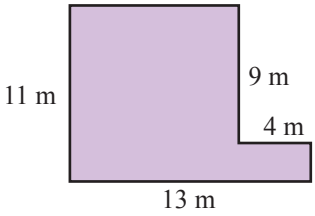

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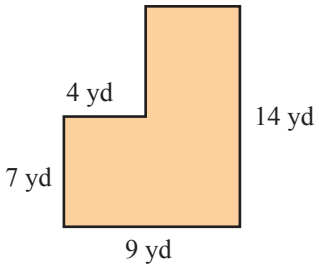


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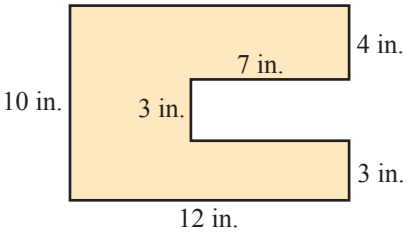


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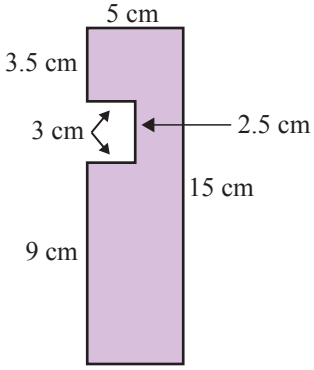


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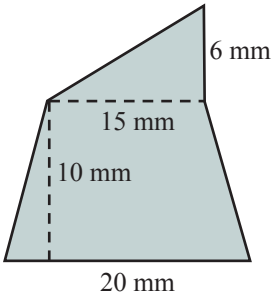


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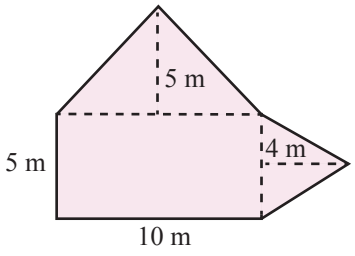


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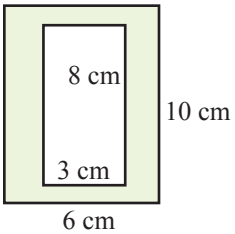


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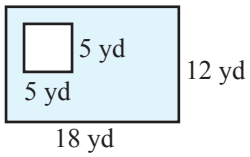


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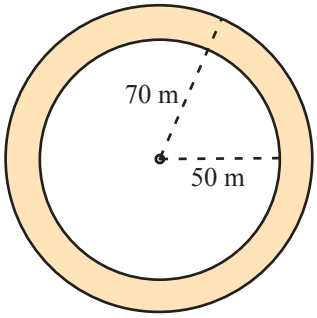
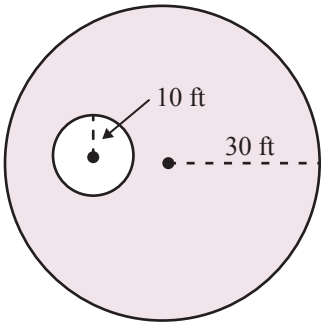



**46.**

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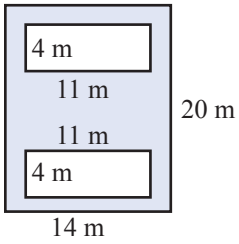


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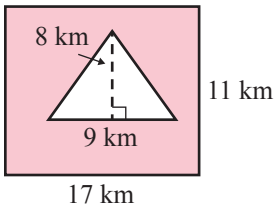


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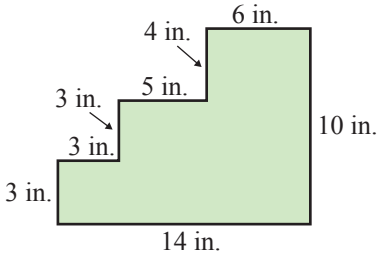

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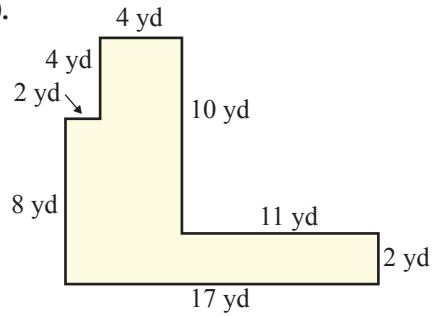
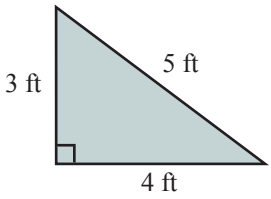
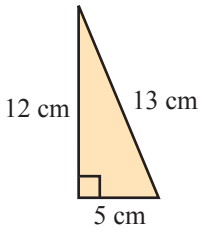



**51.** A **right** triangle is a triangle with one angle of 90°, which means that two sides are perpendicular. The base and the height are the two perpendicular sides. Find the perimeter and the area for each of the following right triangles.

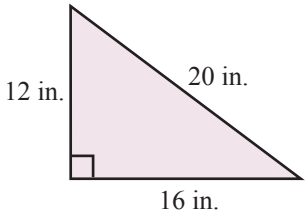
**a.**




**b.**

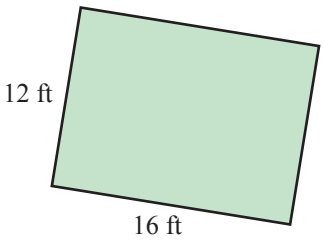



**c.**




Find **a.** the perimeter and **b.** the area. (Use $\pi \approx 3.14$.)

**52.**

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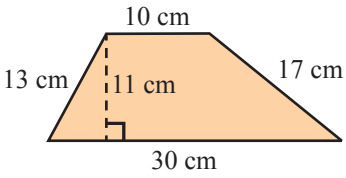


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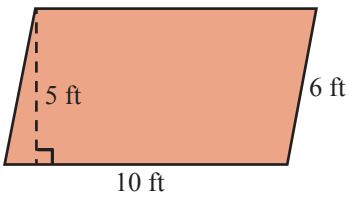


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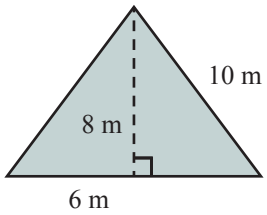


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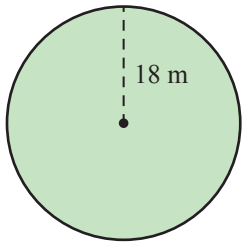


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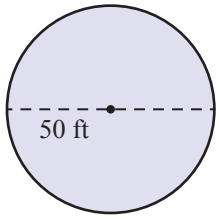


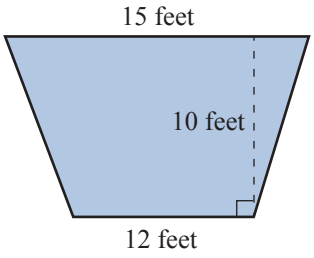
## Applications

Solve. Use $\pi \approx 3.14$.

**58.** The boundaries of a certain small town form a parallelogram with a length of 4.5 miles and a height of 2.6 miles. What is the area within the town limits?

**59.** Vinyl tile is to be laid on the floor of a rectangular room which is 17 feet long and 12 feet wide. How many square feet of tile must be put down?

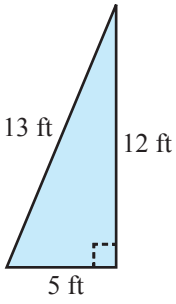
**60.** The main stage at a theater is in the shape of a trapezoid. The owner of the theater is planning to install a new specially designed flooring system on the stage. The stage is 12 feet wide in the front and 15 feet wide in the back. The stage is 10 feet deep. How much flooring will the manager need?




**61.** A sailboat has a triangular sail with the dimensions as shown in the drawing. (Note that the 12 foot measurement is the height of the triangle.)

**a.** What is the area of the sail?

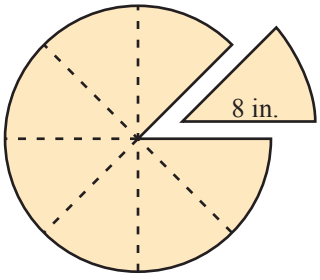
**b.** What is the perimeter of the sail?




**62.** A large 16 in. pizza is cut into eight pieces.

**a.** What is the perimeter of a single piece?

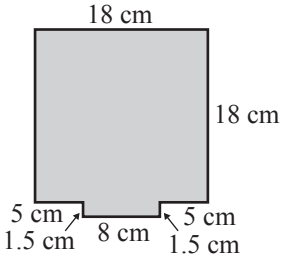
**b.** What is the area of this piece of pizza?



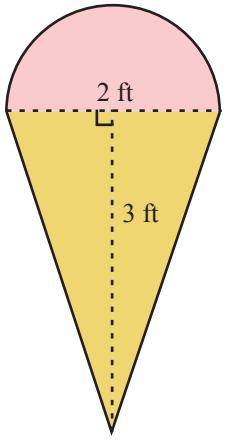

**63.** A square electronics circuit board is 18 centimeters on each side. On the center of one of the edges is a 8 by 1.5 centimeter rectangular lip for plugging in.

**a.** What is the total perimeter of the circuit board, including the lip?

**b.** What is the area of the circuit board?



**64.** Brain Freeze Ice Cream is creating a new wooden sign in the shape of an ice cream cone to display their flavors of the day. The outline of the cone is shown.



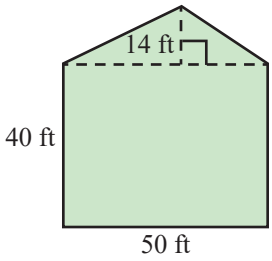

**a.** The sign will be painted to look like an ice cream cone. What is the area of the sign to be painted? Round to the nearest hundredth.

**b.** The sign will have a metal border to protect it from damage. How much metal border will be needed? Round to the nearest hundredth.

**65.** David is planting a five-sided lawn as shown in the figure below. The lawn consists of a 50 foot by 40 foot rectangle and an attached 14 foot high triangle.

**a.** What is the area of the lawn to be planted?

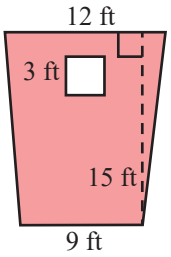
**b.** If one pound of grass seed will cover 200 square feet, how many pounds will be necessary to cover the entire lawn? (**Hint:** Divide the area by the number of square feet that one pound of seed will cover.)



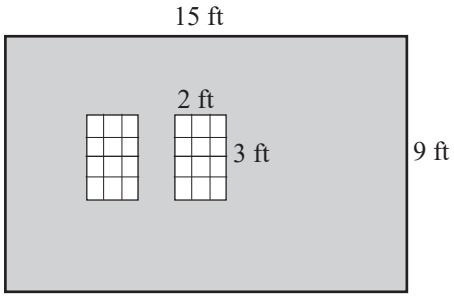

**66.** A trapezoidal patio with a square opening for flowers is to be constructed. As shown on the drawing, the ends of the trapezoid are 12 ft and 9 ft respectively, with a height of 15 ft. Each side of the square cutout is 3 ft.

**a.** What is the area of the concrete surface?

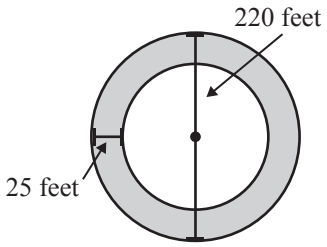
**b.** If the charge to pour and finish the concrete is $9.50 a square foot, what will it cost?



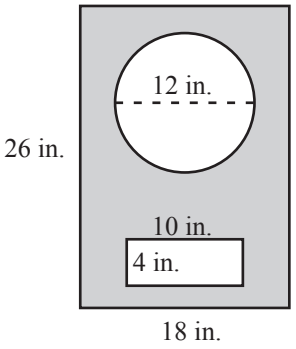

**67.** Bill is painting a wall in his living room. The wall is 9 feet high and 15 feet wide. The wall has two rectangular windows that measure 2 feet by 3 feet. If the windows are not to be painted, determine the area that Bill will be painting.



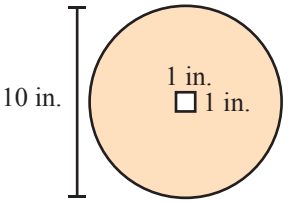
**68.** Some cities use traffic circles rather than traffic lights at major intersections. A traffic circle is a circular road at the intersection, where the driver will enter, drive counterclockwise, and then leave on the desired road. If the outer diameter of the circle is 220 feet, and the road is 25 feet wide, what is the surface area of the traffic circle?




**69.** One common design for speaker cabinets in high quality stereo systems is the bass reflex cabinet, where there is a port (either rectangular or circular) in the front of the cabinet in addition to the speaker itself. If the front panel is 26 inches high and 18 inches wide, what will the area of the panel be if a 12-inch hole is cut out for the speaker, and a 10 inch by 4 inch rectangular port is cutout as shown in the figure.



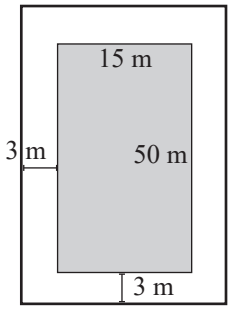

**70.** A 10-inch flywheel has a square opening in the center to connect it to the driving shaft. Assuming that this square hole is 1 inch on the side, what is the area of the flywheel?




**71.** A 12-foot by 10-foot rectangular flower garden has a circular fish pond in the center. The diameter of the fish pond is 6 feet. The gardener plans to place new top soil in the garden before planting flowers. What is the area that will be covered by top soil?

**72.** A 1-page magazine article must have 1-inch margins of blank space surrounding the content of the page. If the magazine pages are 11 inches by 14 inches, determine the largest amount of space that will contain print on this page.

**73.** A concrete patio is being poured to surround a rectangular swimming pool. The pool is 15 meters wide by 50 meters long. If the patio is to be a uniform 3 meters width all around the pool, find the area of the concrete patio.



## Writing & Thinking

**74.** Explain why square units are used for labeling areas. Give two examples each of metric area labels and US customary area labels.

**75.** Give at least three examples where finding the area of a figure would be helpful (outside of a class).

**76.** Draw a rectangle and choose any point on one side of the rectangle. Draw line segments to the vertices on the opposite side (forming three triangles). Now cut out the two triangles on each end. Place these triangles inside the remaining triangle to show that the total of the two areas is equal to the area of the remaining triangle. Do this three different times choosing a different point each time. What fact does this illustrate about the area of a triangle?

**77.** With a piece of string and a ruler, carefully measure the circumference and the diameter of several circular figures in your home. Divide each circumference by the length of the corresponding diameter. What result do you observe? Explain this result in terms of a formula.

## Collaborative Learning

**78.** First, draw a circle with a diameter of 10 cm (radius 5 cm). Next, draw a square outside the circle so that each side of the square just touches the circle. (The square is said to be circumscribed about the circle, and the circle is said to be inscribed in the square.)

**a.** Divide the perimeter of the square by the diameter of the circle. What number did you get?

**b.** Next, on the same figure, draw an octagon (8-sided figure) that is circumscribed about the circle. Measure the perimeter of the octagon as accurately as you can.

**c.** Divide the perimeter of the octagon by the diameter of the circle. What number did you get?

**d.** Now try drawing circumscribed polygons with more sides (such as a 16-sided figure, a 32-sided figure, and so on) about the circle. Describe the numbers you think you would get by dividing the perimeters of these figures by the diameter of the circle.