Learn About

Using Geometry: Perimeter, Area and Volume

The **perimeter** of a polygon is the distance around the figure. For a circle, the distance around the figure is called the **circumference. Area** is the amount of space a plane figure takes up. **Volume** is the amount of space a solid figure takes up.

You can use these formulas to find the area of plane figures and the volume of solid figures:

Area		Volume	
rectangle	$A = lw$	rectangular prism	$V = lwh$
triangle	$A = \frac{1}{2}bh$	cylinder	$V = \pi r^2 h$
circle	$A = \pi r^2$	cone	$V = \frac{1}{3}\pi r^2 h$

Dean's parents bought cone-shaped party hats. The radius of each party hat is 5 centimetres. The height is 12 centimetres. What is the area of the circular base of each party hat rounded to the nearest tenth of a centimetre? What is the volume?

Use the formula $A = \pi r^2$ to calculate the area. Use 3.14 for π.
$A = \pi \times (5)^2 = 78.5$ cm²

Use $V = \frac{1}{3}\pi r^2 h$ to find the volume. You already know that $\pi r^2 \approx 78.5$ cm². Substitute the remaining information.

$V = \frac{1}{3}(78.5)(12) = 314$ cm³

The area of the base is **78.5 cm²** and the volume of the hat is **314 cm³**

Remember:

The **perimeter** of a polygon is the distance around the figure. The **circumference** is the distance around a circle. **Area** is the amount of space a plane figure takes up. **Volume** is the amount of space a solid figure takes up.

1. **Each unit on the coordinate grid represents 2 centimetres. What is the area of the photo?**

   Ⓐ 2 square centimetres

   This answer is not correct because the base and height of the triangle are both 4 centimetres, not 2 centimetres. Each unit represents 2 centimetres.

   $A = \frac{1}{2}(4)(4)$

   $A = \frac{1}{2}(16)$

   $A = 8\ cm^2$

   ● 8 square centimetres

   This answer is correct because the area formula for a triangle is $A = \frac{1}{2}bh$.

   $A = \frac{1}{2}(4)(4)$

   $A = \frac{1}{2}(16)$

   $A = 8\ cm^2$

   Ⓒ 16 square centimetres

   This answer is not correct because the area formula for a triangle is $A = \frac{1}{2}bh$, not base × height.

   Ⓓ 32 square centimetres

   This answer is not correct because the area formula for a triangle is $A = \frac{1}{2}bh$.

   $A = \frac{1}{2}(4)(4)$

   $A = \frac{1}{2}(16)$

   $A = 8\ cm^2$

2. **Which statement describes the movement from triangle *PIC* to triangle *P'I'C'*?**

   Ⓐ Add 8 units to the *x*-coordinate and add 3 units to the *y*-coordinate.

   This answer is not correct because adding 8 units to the x-coordinate moves the figure to the right on the coordinate grid. The figure shown in the diagram moved to the left. Also, adding 3 units to the y-coordinate moves the figure up on the coordinate grid. The figure shown in the diagram moved down.

   ● Subtract 8 units from the *x*-coordinate and subtract 3 units from the *y*-coordinate.

   This answer is correct because subtracting 8 units from the x-coordinate moves the figure to the left on the coordinate grid, and subtracting 3 units from the y-coordinate moves the figure down on the coordinate grid. The number of units matches what is shown on the grid.

   Ⓒ Subtract 3 units from the *x*-coordinate and subtract 8 units from the *y*-coordinate.

   This answer is not correct because subtracting 3 units from the x-coordinate does not move the figure far enough to the left and subtracting 8 units from the y-coordinate moves the figure too far down on the coordinate grid.

   Ⓓ Add 8 units to the *x*-coordinate and subtract 3 units from the *y*-coordinate.

   This answer is not correct because adding 8 units to the x-coordinate moves the figure to the right on the coordinate grid. The figure shown in the diagram moved to the left.
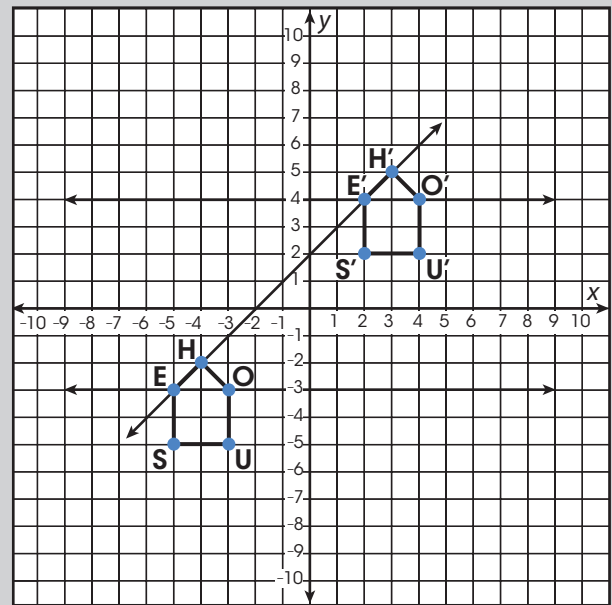
Keeping the Kennel Clean

Jane and Pete have a dog named Sam. Because of heavy rains during the last week, Sam's kennel is surrounded by mud. Jane and Pete have decided to move the kennel to a different location. Figure *HOUSE* shows the original placement of the kennel. Figure *H'O'U'S'E'* shows the new location of the kennel.

1. Jane and Pete want to slide the kennel *HOUSE* to its new location at *H'O'U'S'E'*. What needs to be done to the *x*- and *y*-coordinates?

   Ⓐ Add 6 to the *x*-coordinate and 7 to the *y*-coordinate.

   Ⓑ Add 7 to the *x*-coordinate and 7 to the *y*-coordinate.

   Ⓒ Add 7 to the *x*-coordinate and 6 to the *y*-coordinate.

   Ⓓ Add 6 to the *x*-coordinate and 6 to the *y*-coordinate.

2. The measure of ∠*OEH* is 45°. Which other angle measures 45°?

   Ⓐ ∠*O'H'E'*

   Ⓑ ∠*E'H'O'*
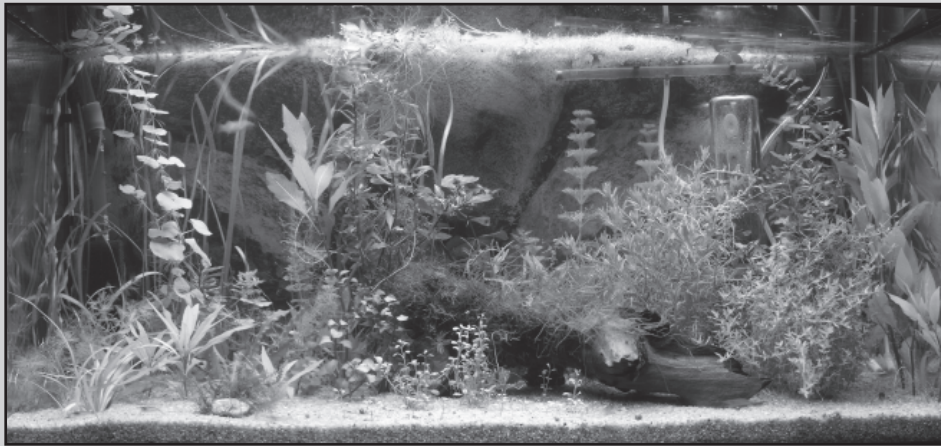
   Ⓒ ∠*H'E'O'*

   Ⓓ ∠*S'E'H*

Lesson 17

**Read the passage.
Then do Numbers 1–5.**

Setting Up an Aquarium

Matilda and Anthony live with their mother in a small apartment. They want a pet, so their mother agrees to get some fish and a small aquarium. At the pet shop, they discover that they have several choices to make. They need to decide the type and number of fish to buy, the size of the fish tank, and what accessories they want.

1. One fish tank is 60.25 centimetres long, 24.5 centimetres wide and 36.75 centimetres high. What is the volume of this fish tank, rounded to the nearest tenth of a cubic centimetre?

   Ⓐ 1476.1 cubic centimetres

   Ⓑ 2214.2 cubic centimetres

   Ⓒ 54,247.6 cubic centimetres

   Ⓓ 108,495.2 cubic centimetres

2. Another fish tank is 72.25 centimetres long, 24.6 centimetres wide and 32.75 centimetres high. How do the two tanks compare in volume?

   Ⓐ The first tank is larger.

   Ⓑ The second tank is larger.

   Ⓒ They are about the same size.

   Ⓓ The second tank is almost twice the size of the first.

Self-Assessment 2
Lessons 6–10

Answer these questions after you have completed Lessons 6–10. Before you begin, re-read what you wrote in Self-Assessment 1.

FOCUS on Using Geometry, Book G

Name _____ Date _____

1. Rate your work in Lessons 6–10. Circle your answer.

   successful   somewhat successful   needs improvement

2. Did any of the questions give you trouble? _____
   If so, what kind of trouble did you have?

   _____

   _____

   Is this the same kind of trouble you had in Lessons 1–5? _____

3. Did you find the questions easier or more difficult than those in Lessons 1–5?

   _____

   Why do you think this is so?

   _____

   _____

4. Did you meet the goal you set for yourself for Lessons 6–10? _____
   Why or why not?

   _____

   _____

5. What is your goal for Lessons 11–15?

   _____

   _____

Cut along the dotted line.