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ELEMENTS OF
BASIC GEOMETRY

PERIMETERS IN REAL LIFE



Ann has a trampoline. Sometimes she bumps her head on the bar that goes around the edge of the trampoline. She is going to put a rubber safety tube around the edge.




Ann's trampoline is in the shape of a heptagon. It has seven sides. Ann measures one side. It is six feet in length.

What is the perimeter? _____

How many feet of rubber tubing does Ann need? _____

The Game: Fill in the chart. Write the name of the shape in the first column. $s = 5$

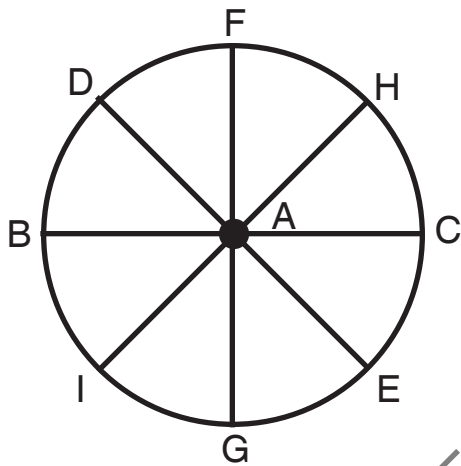
NAME OF THE SHAPE	NUMBER OF SIDES	PERIMETER $s + s + s + s$	SHAPE
TRIANGLE TRIANGLE	3	$5 + 5 + 5 = 15$	
PENTAGON			
OCTAGON			
SQUARE			
DECAGON			

DIAMETERS

A chord is any line segment with both endpoints on the circle. A diameter is a chord that passes through the center of the circle. Every diameter of the same circle is the same length.



Look at $\odot A$. \overline{BC} , \overline{DE} , \overline{FG} , and \overline{HI} are diameters of $\odot A$.



- $\overline{BC} = 2''$
- $\overline{DE} = \underline{\hspace{2cm}}$
- $\overline{FG} = \underline{\hspace{2cm}}$
- $\overline{HI} = \underline{\hspace{2cm}}$

The Game: Follow the directions!

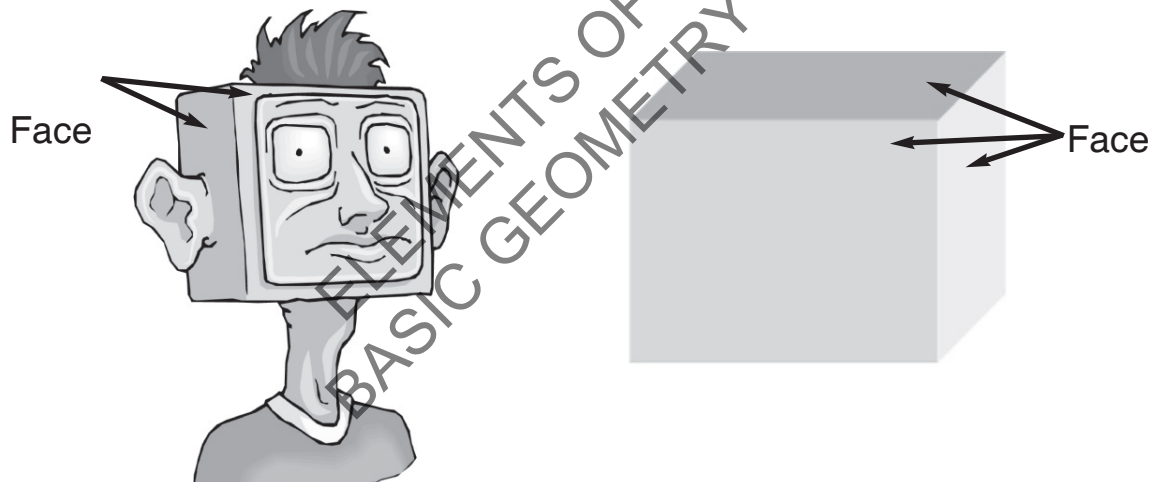
<p>Draw $\odot X$. \overline{NO}, \overline{PQ}, and \overline{RS} are diameters of $\odot X$.</p> <p>$\overline{NO} = 2''$ $\overline{PQ} = \underline{\hspace{2cm}}$ $\overline{RS} = \underline{\hspace{2cm}}$</p>	<p>Draw $\odot G$. \overline{HI}, \overline{JK}, \overline{LM}, and \overline{NO} are diameters of $\odot G$.</p> <p>$\overline{HI} = 4 \text{ cm}$ $\overline{JK} = \underline{\hspace{2cm}}$ $\overline{LM} = \underline{\hspace{2cm}}$ $\overline{NO} = \underline{\hspace{2cm}}$</p>
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MANY FACES

Polyhedron is a fancy name for some space figures. Pyramids and cubes are polyhedrons. They have flat surfaces. A cube has flat surfaces, so it is a polyhedron. A sphere is round. It has a curved surface, so it is not a polyhedron.

The word "polyhedron" is a Greek word. "Poly" means "many," and "hedra" means "face."

The flat surfaces on polyhedrons are called faces. You can't see all of the faces at one time.



The Game: Write T for True or F for False.

1. A polyhedron is not a space figure. _____
2. "Poly" means "many." _____
3. A polyhedron has curved surfaces. _____
4. The flat surfaces of polyhedrons are faces. _____
5. A cube is a polyhedron. _____

CYLINDERS

A cylinder is a 3D shape that looks like a tube, a pipe, or a can of soup. A cylinder has two parallel bases that are congruent circles.

How much water will a can hold? To find the volume of a cylinder, follow these steps:

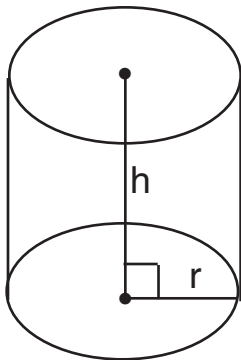
1. Square the radius.
2. Multiply by pi.
3. Multiply by the height.



The volume of a cylinder equals pi times the radius squared times the height.

$$V = \pi r^2 h$$

The radius is 5 cm. The height is 10 cm. Use a calculator and find the volume of the can.



The problem →	$V = ?$
The formula →	$V = \pi r^2 h$
Plug in what you know. →	$V = \pi 5^2 10$
Square the radius. →	$5 \times 5 = 25$
Multiply by pi. →	$25 \times 3.14 = 78.5$
Multiply by the height. →	$78.5 \times 10 = 785$
Plug in the answer. →	$V = 785 \text{ cc}$

The volume of the cylinder is about _____ cubic centimeters.

The Game: Draw a cylinder and figure the volume. The radius is 2 cm. The height is 3 cm.

What is the volume? _____ cubic centimeters

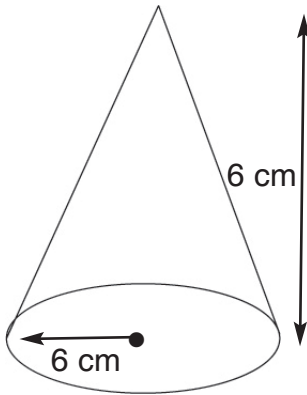
CONES AND VOLUME

The spires on a castle are cone shaped. A spire is the top part of a tower that tapers or slims to a point.

$$V = \frac{1}{3}\pi r^2 h$$



The radius is 6 cm. The height is 6 cm. What is the volume of the cone?



The problem →

The formula →

Plug in what you know. →

Square the radius. →

Multiply by pi. →

Multiply by the height. →

Multiply by 1/3. →

Plug in the answer. →

The volume is about _____ cubic centimeters.

$$V = ?$$

$$V = \frac{1}{3}\pi r^2 h$$

$$V = \frac{1}{3}\pi 6^2 \cdot 6$$

$$6 \times 6 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} \times 3.14 = 113.04$$

$$113.04 \times 6 = 678.24$$

$$\frac{1}{3}(678.24) = 678.24 \div 3 = 226.08$$

$$V = 226.08 \text{ cc}$$

The Game: Find the volume of the spire.

Look at the spire. The radius is 6 ft. The height is 5 ft. What is the volume?



The problem →

The formula →

Plug in what you know. →

Square the radius. →

Multiply by pi. →

Multiply by the height. →

Multiply by 1/3. →

Plug in the answer. →

The volume is about _____ cubic feet.

$$V = ?$$

$$V = \frac{1}{3}\pi r^2 h$$

$$V = \frac{1}{3}\pi 6^2 \cdot 5$$

$$6 \times 6 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} \times 3.14 = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} \times 5 = \underline{\hspace{2cm}}$$

$$\frac{1}{3}(\underline{\hspace{2cm}}) = \underline{\hspace{2cm}}$$

$$V = \underline{\hspace{2cm}} \text{ cu ft}$$