

Name _____

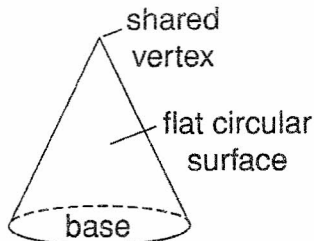
Date _____

Volume of Pyramids, Cones and Spheres

8-6 Compare and Contrast

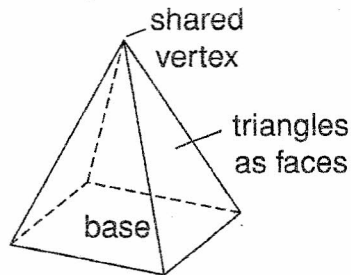
Compare the shapes of these three-dimensional figures.

Cone



curved
edge

Pyramid



Compare the facts for the cone and the pyramid.

- three-dimensional figure
- base is a circle
- other face is a curved surface
- one vertex
- three-dimensional figure
- base is a polygon
- other faces are triangles
- at least four vertices

Compare the pictures and the facts about the cone and the pyramid to answer the questions.

1. Which figure has a circular base?

The cone has a circular base.

2. What is the shape of the base of a pyramid?

The shape of the base of a pyramid is a polygon.

3. Which figure has triangles as faces?

The pyramid has faces that are triangles.

4. How many bases does each figure have?

Each figure - the cone and the pyramid has one base.

5. How many dimensions does each figure have?

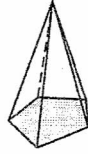
Each figure is three-dimensional

6. How are the figures different?

The cone has a circular base with one vertex while the pyramid has a base shape that is a polygon with at least 4 vertices

8-6 Volume of Pyramids and Cones

Pyramid: solid figure named for the shape of its base, which is a polygon; all other faces are triangles

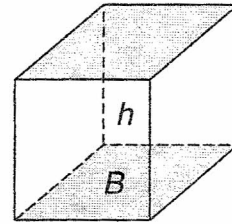
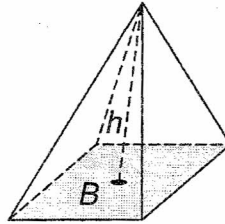


Pentagonal Pyramid

This rectangular pyramid and rectangular prism have congruent bases and congruent heights.

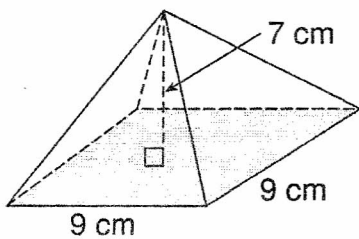
Volume of Pyramid = $\frac{1}{3}$ Volume of Prism

$$V = \frac{1}{3} Bh$$



Complete to find the volume of each pyramid.

1. square pyramid



base is a square

$$V = \frac{1}{3} Bh$$

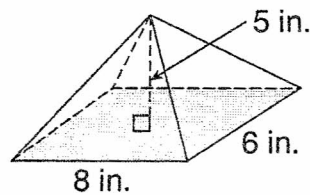
$$V = \frac{1}{3} (\text{area of square}) \cdot h$$

$$V = \frac{1}{3} (9 \cdot 9) \cdot 7$$

$$V = \frac{1}{3} (81) \cdot 7 = \frac{567}{3}$$

$$V = 189 \text{ cm}^3$$

2. rectangular pyramid



base is a rectangle

$$V = \frac{1}{3} Bh$$

$$V = \frac{1}{3} (\text{area of rectangle}) \cdot h$$

$$V = \frac{1}{3} (8 \cdot 6) \cdot 5$$

$$V = \frac{1}{3} (48) \cdot 5 = \frac{240}{3}$$

$$V = 80 \text{ in}^3$$

2 pts.

2 pts

* Do not change $\frac{1}{3}$ to a decimal but divide by 3!

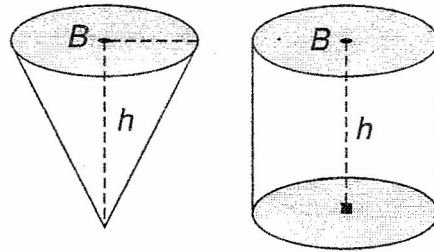
8-6 Volume of Pyramids and Cones (continued)

Cone: solid figure with a circular base

This cone and cylinder have congruent bases and congruent heights.

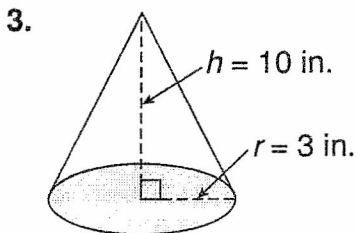
Volume of Cone = $\frac{1}{3}$ Volume of Cylinder

$$V = \frac{1}{3} Bh$$



*** Do not change $\frac{1}{3}$ to a decimal but divide by 3.**

Complete to find the volume of each cone.



radius r of base = 3 in.

2pts. $V = \frac{1}{3} Bh$

2pts. $V = \frac{1}{3} (\pi r^2) h$

$$V = \frac{1}{3} (\pi \cdot \underline{3^2}) \cdot \underline{10}$$

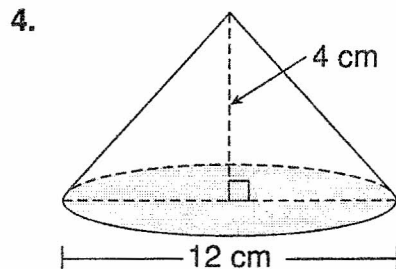
$$V = \frac{1}{3} (\underline{9\pi}) \cdot \underline{10}$$

$$V = \underline{3\pi} \cdot \underline{10}$$

4pts. $V = \underline{30\pi} \text{ in}^3$

$$V \approx \underline{30} \cdot 3.14$$

$$V \approx \underline{94.2} \text{ in}^3$$



radius $r = \frac{1}{2}$ diameter = 6 cm

$$V = \frac{1}{3} Bh$$

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

$$V = \frac{1}{3} (\pi \cdot \underline{6^2}) \cdot \underline{4}$$

$$V = \frac{1}{3} (\underline{36\pi}) \cdot \underline{4}$$

$$V = \underline{12\pi} \cdot \underline{4}$$

$$V = \underline{48\pi} \text{ cm}^3$$

$$V \approx \underline{48} \cdot 3.14$$

$$V \approx \underline{150.72} \text{ cm}^3$$

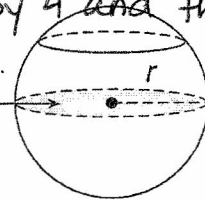
Reteach

Spheres

Sphere: the set of points in space at a fixed distance (its *radius r*) from a fixed point (its *center*)

* Do not change $\frac{4}{3}$ to a decimal multiply by 4 and then divide by 3!

Great Circle



Sphere

Volume V of Sphere = $\frac{4}{3}\pi r^3$

For a sphere of radius = 9 cm,

$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3}\pi \cdot 9^3 = \frac{4}{3}\pi \cdot 729 = \frac{4 \times 729}{3}\pi = 972\pi \text{ cm}^3$

$V \approx 972(3.14) \approx 3052.08 \text{ cm}^3$

Complete to find the volume of the sphere.

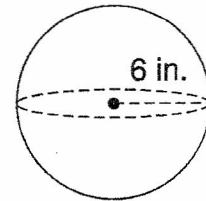
2 pts.

1. $V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3}\pi \cdot 6^3 = \frac{4}{3}\pi \cdot 6 \cdot 6 \cdot 6 = \frac{4 \cdot \pi \cdot 6 \cdot 6 \cdot 6}{3}$

$V = 288\pi \text{ in}^3$

$V \approx 288(3.14) \approx 904.32 \text{ in}^3$



Practice Spheres

HOMework for Tuesday/Wednesday

Find the volume of each sphere, both in terms of π and to the nearest tenth. Use 3.14 for π .

1. $r = 9 \text{ ft}$

2. $r = 21 \text{ m}$

3. $d = 30 \text{ cm}$

4. $d = 24 \text{ cm}$

5. $r = 15.4 \text{ in.}$

6. $r = 16.01 \text{ ft}$
