Geometry

Chapter 11

Section 11-3, 11-5

Vocabulary

Pyramid

Polyhedron whose base is a polygon and whose lateral faces are triangles meeting at a single common vertex.

Regular Pyramid

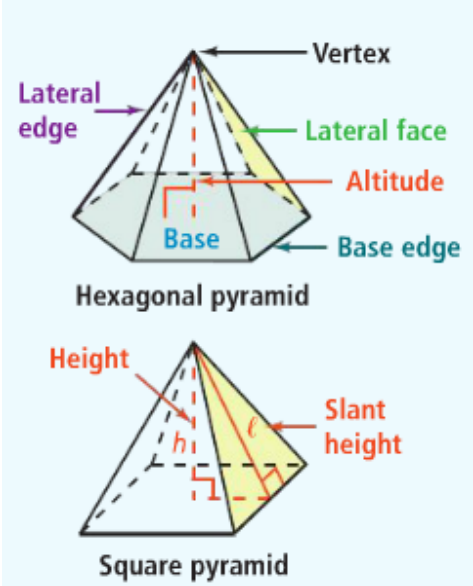
Polyhedron whose base is a regular polygon and whose lateral faces are congruent isosceles triangles.

Altitude

Perpendicular segment from top vertex to plane of the base. Height is the length of the altitude segment.

Slant Height

Height of a lateral isosceles triangle of a regular pyramid.



***Assume pyramids are regular unless stated otherwise

Vocabulary

Cone

3D solid with a circle base and a single vertex that is not coplanar with the base.

Altitude

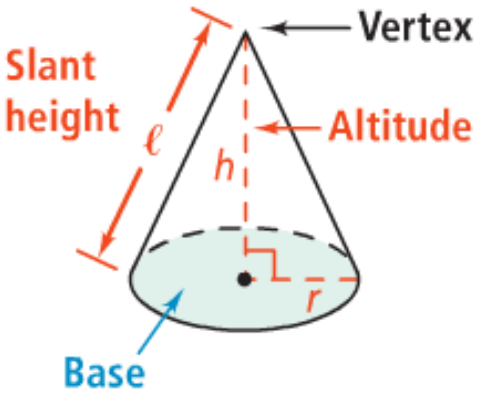
Perpendicular segment from top vertex to plane of the base. Height is the length of the altitude segment.

Right Cone

Cone whose altitude segment can be drawn from the vertex to the center of its circle base.

Slant Height

Distance from the vertex to the edge of the circle base.



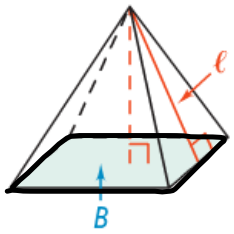
***Assume cones are right cones unless stated otherwise

take note

Theorem 11-3 Lateral and Surface Areas of a Pyramid

The lateral area of a regular pyramid is half the product of the perimeter p of the base and the slant height ℓ of the pyramid.

$$\text{L.A.} = \frac{1}{2}p\ell$$



The surface area of a regular pyramid is the sum of the lateral area and the area B of the base.

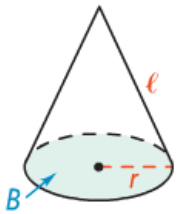
$$\text{S.A.} = \text{L.A.} + B \rightarrow \frac{1}{2}p\ell + B$$

take note

Theorem 11-4 Lateral and Surface Areas of a Cone

The lateral area of a right cone is half the product of the circumference of the base and the slant height of the cone.

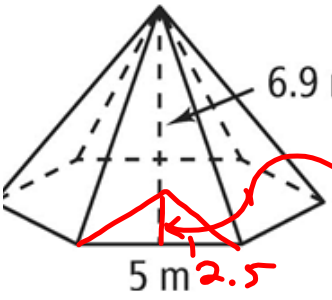
$$\text{L.A.} = \frac{1}{2} \cdot 2\pi r \cdot \ell, \text{ or L.A.} = \pi r\ell$$



The surface area of a cone is the sum of the lateral area and the area of the base.

$$\text{S.A.} = \text{L.A.} + B \rightarrow \pi r\ell + \pi r^2$$

Find the lateral and surface areas of the solids.



$\frac{1}{2}p\ell$

$2.5\sqrt{3}$

$\frac{1}{2}ap=\frac{1}{2}(2.5\sqrt{3})(30)$

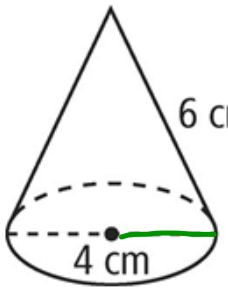
$37.5\sqrt{3}=B$

$LA=\frac{1}{2}(30)(6.9)$

15

$LA=103.5\,m^2$

$SA=103.5+37.5\sqrt{3}\,m^2$



$\pi 2^2$

$LA=\pi(2)(6)$

$LA=12\pi\,cm^2$

$SA=12\pi+4\pi$

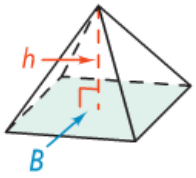
$SA=16\pi\,cm^2$

take note

Theorem 11-8 Volume of a Pyramid

The volume of a pyramid is one third the product of the area of the base and the height of the pyramid.

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



**Note:

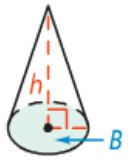
The volume of a pyramid is one-third the volume of a prism with the same base and height

take note

Theorem 11-9 Volume of a Cone

The volume of a cone is one third the product of the area of the base and the height of the cone.

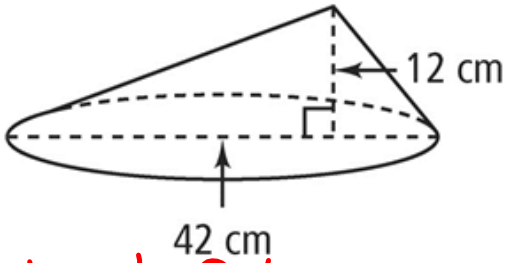
$$V = \frac{1}{3}Bh, \text{ or } V = \frac{1}{3}\pi r^2 h$$



**Note:

The volume of a cone is one-third the volume of a cylinder with the same base and height

Find the volume of each solid. Round answers to 3 decimal places.



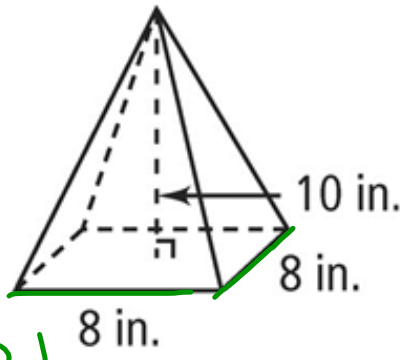
$V = \frac{1}{3}Bh$

$V = \frac{1}{3}(\pi 21^2)12$

$441\pi \cdot 4$

1764π

$V = 5541.769\ cm^3$



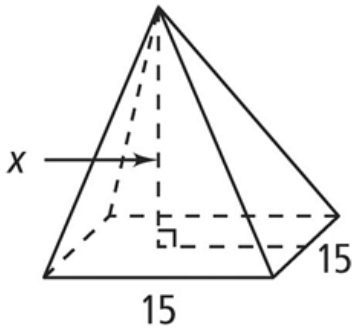
$V = \frac{1}{3}Bh$

$V = \frac{1}{3} \cdot 64 \cdot 10$

$V = \frac{640}{3}$

$V = 213.333\ in^3$

Solve for x.



Volume = 1500

$V = \frac{1}{3} B h$

$\frac{1500}{75} = \frac{\frac{1}{3}(225)h}{75}$

$20 = h$

Homework

Pages 713 - 714
9, 12, 16, 20, 22, 27, 28, 31

Pages 730 - 731
10 - 26 even