

# Geometry

## Chapter 11

### Section 11-3

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## Pyramids

### Pyramid

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

### Regular Pyramid

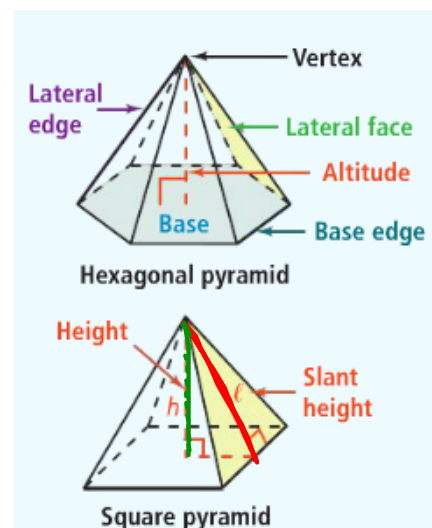
Polyhedron whose base is a regular polygon and whose lateral faces are congruent isosceles triangles.

### Altitude

Perpendicular segment from top vertex to the base plane. 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

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# Vocabulary

## Cone

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

## Altitude

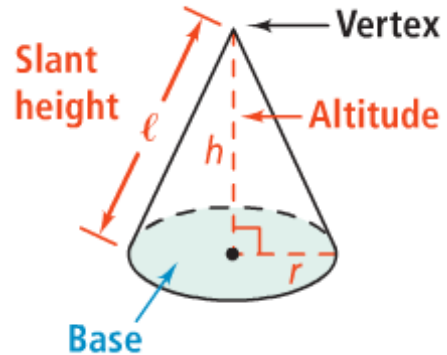
Perpendicular segment from top vertex to the base plane. Height is the length of the altitude segment.

## Right Cone

Cone whose altitude segment intersects the center of its circular base.

## Slant Height

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



\*\*\*Assume cones are right cones unless stated otherwise

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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  $\ell$  of the pyramid.

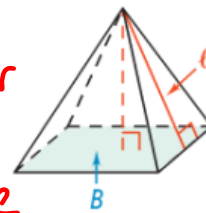
$$L.A. = \frac{1}{2}p\ell$$

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

$$S.A. = L.A. + B$$

$$\hookrightarrow \frac{1}{2}p\ell + B$$

*p - perimeter of base*



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.

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

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

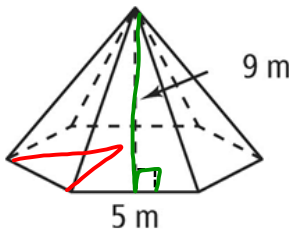
$$S.A. = L.A. + B$$

$$\hookrightarrow \pi r\ell + \pi r^2$$



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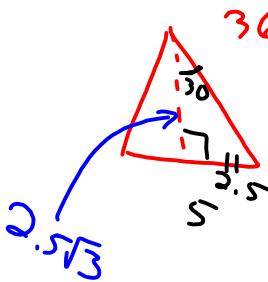
Find the lateral and surface areas of the solid.



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

$$LA = \frac{1}{2} (30)(9)$$

$$LA = 135 \text{ m}^2$$



$$360 \div 6 = 60 \quad SA = LA + B$$

$$SA = 135 + 37.5\sqrt{3} \text{ m}^2$$

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

$$B = 37.5\sqrt{3}$$

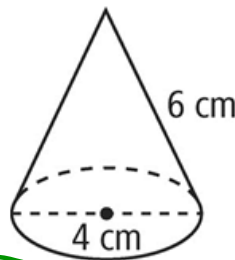
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Find the lateral and surface areas of the solid.

$$LA = \pi r \ell$$

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

$$= 12\pi \text{ cm}^2$$



$$SA = LA + B$$

$$= 12\pi + \pi 2^2$$

$$SA = 16\pi \text{ cm}^2$$

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Find the lateral and surface areas of the solid.

$$LA = \frac{1}{2} p l$$

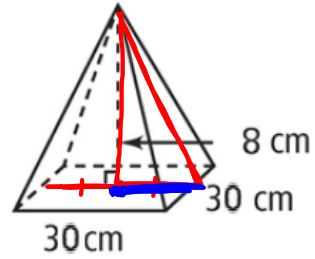
$$LA = \frac{1}{2} (120)(17)$$

$$LA = 1020 \text{ cm}^2$$

$$SA = LA + B$$

$$= 1020 + 900$$

$$SA = 1920 \text{ cm}^2$$



$$8^2 + 15^2 = l^2$$

$$64 + 225 = l^2$$

$$\sqrt{289} = \sqrt{l^2}$$

$$17 = l$$



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# Homework

Pages 713 - 714

# 9, 12, 16, 20, 22, 27, 28, 31

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