

Lesson 3 Surface Areas of Right Pyramids and Right Cones

Recall:

Perimeter of a Square: $P = 4s$

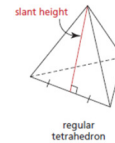
Area of a Square: $A = s^2$

Pythagorean Theorem: $a^2 + b^2 = c^2$

Right Pyramid – are 3-dimensional objects that have triangular faces and a base that is a polygon.

Right Circular Cone – is a 3-dimensional object that has a circular base and a curved surface.

Tetrahedron – a pyramid that has a triangular base.



Apex – where the triangular faces meet

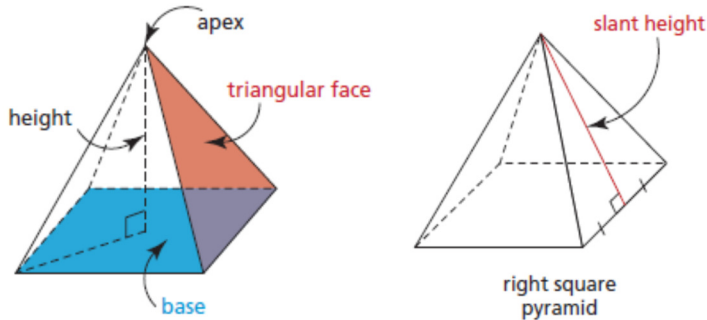
Height – is the perpendicular distance from the apex to the centre of the base.

Regular Polygon – a polygon that has all sides equal and all angles equal.

Lateral Area – the surface area of an object, not including the base (just the sides)

Slant Height – is the height of a triangular face.

Right Pyramid



If the base is a regular polygon, the triangular faces are congruent.

To determine the surface area of a Right Pyramid, you can add the areas of each side.



Surface Area of a Right Pyramid with a Regular Polygon Base

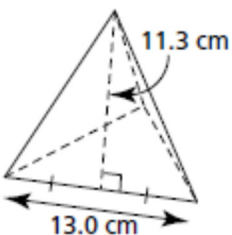
$$\text{Surface Area} = \text{lateral area} + \text{base area}$$

$$\text{Surface Area} = \frac{1}{2}s(\text{perimeter of base}) + (\text{base area})$$

where s is slant height

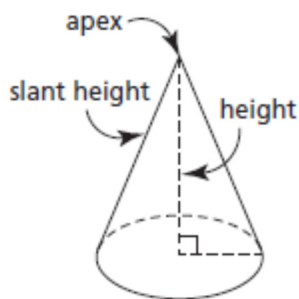
Example 1

Determine the lateral surface area of this right pyramid, to the nearest square unit.



Example 2

Determine the surface area of a right square pyramid with a base length of 5 cm and a perpendicular height of 12 cm.

Surface Area of a Right Circular Cone**Surface Area of a Right Circular Cone**

$$SA = \textit{lateral area} + \textit{base area}$$

$$SA = \pi r s + \pi r^2$$

where: r is radius and s is slant height

Example 1

A right cone has a base radius of 4 m and a height of 10 m. Determine the surface area of this cone, to the nearest square metre.

Example 2

The lateral area of a cone is 220 cm^2 . The diameter of the cone is 10 cm. Determine the height of the cone, to the nearest tenth of a centimeter.