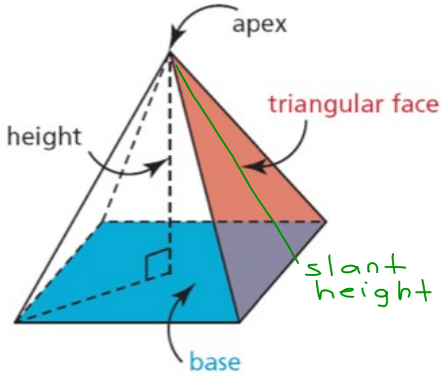
Surface Area of Right Pyramids

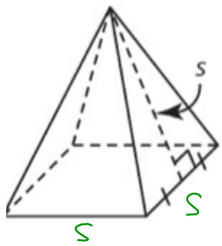
Right pyramid = a 3-D object that has triangular faces and a base that is a polygon.



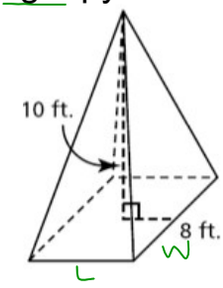
Apex = the point where the triangular faces meet.

Height = the perpendicular distance from the apex to the centre of the base.

2 different types of right pyramids:



Right Square



Right Rectangular

$$SA_{square} = A_{base} + 4A_{side}$$

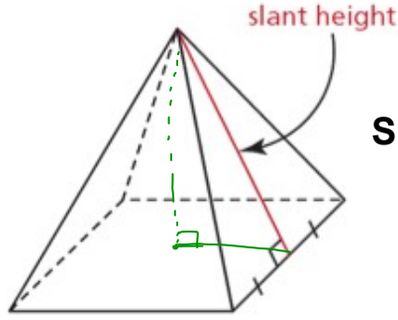
s^2 $\left(\frac{bh}{2}\right)$

$$SA_{rectangular} = A_{base} + 2A_{side1} + 2A_{side2}$$

LW $\left(\frac{bh}{2}\right)$ $\left(\frac{bh}{2}\right)$

The **surface area of a right pyramid** is a sum of the lateral area (areas of the triangular faces) and the base area.

In order to find the area of the triangular faces we use **slant height**.

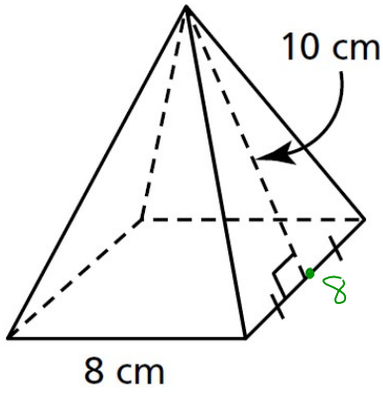


right square pyramid

Slant height = the height of the triangular face.

Ex. 1

Calculate the surface area of the right square pyramid.



$SA = s^2 + 4\left(\frac{bh}{2}\right)$

$= 8^2 + 2(8)(10)$

$= 64 + 160$

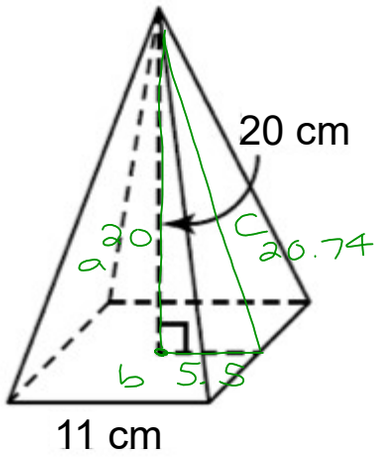
$= 224\ cm^2$

What is the lateral surface area? $160\ cm^2$

(sides)

Ex. 2

Calculate the surface area of each right square pyramid:



$a^2 + b^2 = c^2$

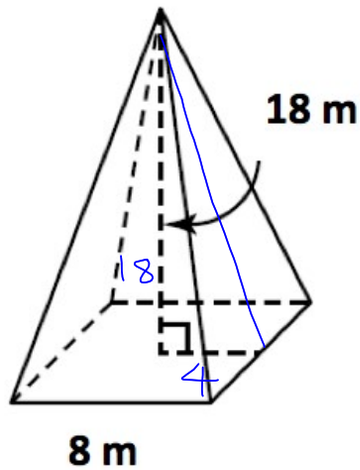
$20^2 + 5.5^2 = c^2$

$\sqrt{430.25} = \sqrt{c^2}$

$20.74 = c$

$SA = 11^2 + 2(11)(20.74)$

$= 577.28\ cm^2$



$4^2 + 18^2 = c^2$

$\sqrt{340} = c$

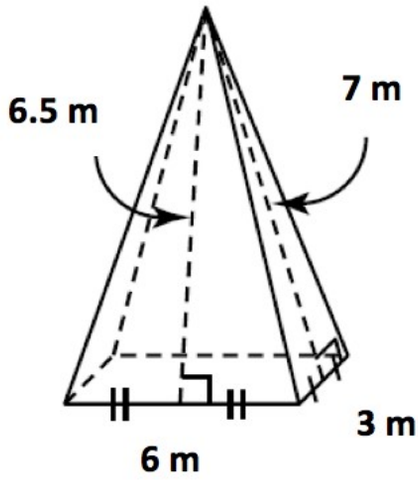
$18.44 = c$

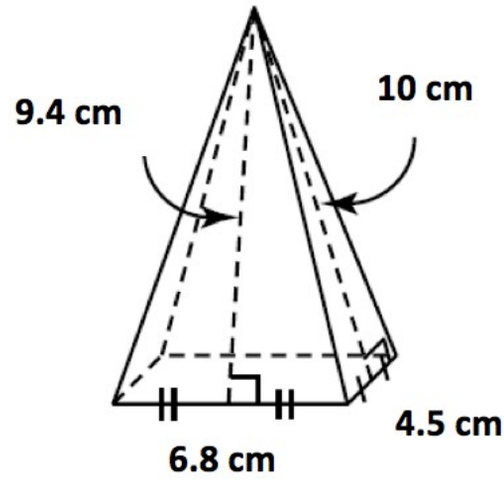
$SA = 8^2 + 2(8)(18.44)$

$= 359.04 m^2$

Ex. 3

Calculate the surface area of each right rectangular pyramid:





$SA = LW + 2\left(\frac{bh}{2}\right) + 2\left(\frac{bh}{2}\right)$

$= (6)(3) + (6)(6.5) + (3)(7)$

$= 18 + 39 + 21$

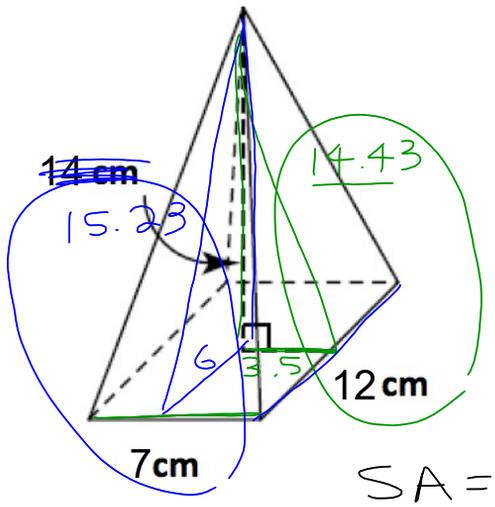
$= 78\ m^2$

$SA = (6.8)(4.5) + (9.4)(6.8) + (4.5)(10)$

$= 139.52\ cm^2$

Ex 4:

Determine the surface area of the right rectangular pyramid.



$3.5^2 + 14^2 = c^2$

$\sqrt{208.25} = c$

$14.43 = c$

$6^2 + 14^2 = c^2$

$\sqrt{232} = c$

$15.23 = c$

$SA = (7)(12) + (7)(15.23) + (12)(14.43)$

$= 363.77\ cm^2$

p. 34 #4a, 5, 8a, 9, 10, 13