

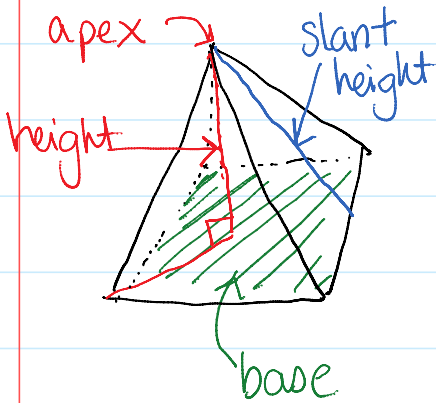
1.4 Surface Area: Right Pyramids & Right Cones

September-09-13

11:25 AM

Right Pyramid

- 3-D object that has triangular faces and a base that is a polygon.
- faces meet at a point → apex
- the height of the pyramid is the ^{perpendicular} distance from the apex to the centre of the base



- * the shape of the base determines the name of the pyramid
- * the slant height is the height of a triangular face

Surface Area: sum of areas of triangular faces + area of base

only 1 triangle!

$$SA = \frac{1}{2}bh$$

+

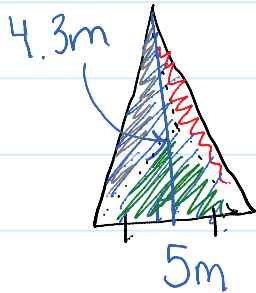
$$SA_{\text{base}} = b^2$$



$$SA = 2bs + b^2$$

Ex. 1

Calculate SA of this triangular pyramid



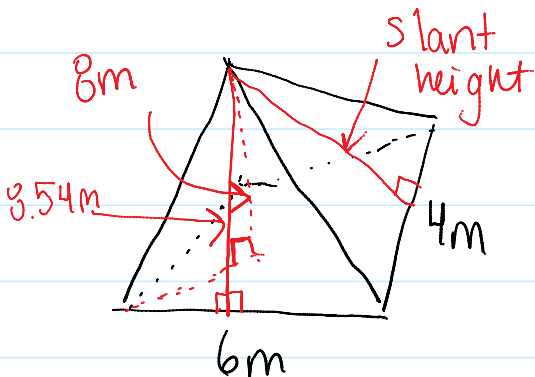
$$SA_{\text{triangle}} = \frac{1}{2}bh$$

$$= \frac{1}{2}(5)(4.3)$$

$$= 10.75 \times 4 \text{ faces} = 43 \text{ m}^2$$

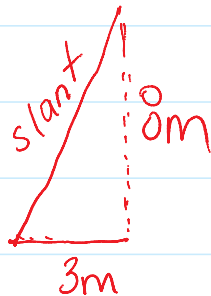
Ex. #2

A right rectangular pyramid has base dimensions 4m x 6m and a height of 8m. ?SA?



$$SA = 2bs + lw$$

no slant height!

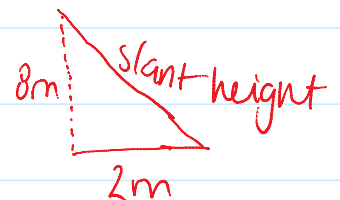


$$a^2 + b^2 = c^2$$

$$3^2 + 8^2 = c^2$$

$$9 + 64 = c^2$$

$$\sqrt{73} = \sqrt{c^2}$$



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

$$8^2 + 2^2 = c^2$$

$$1 + 64 = c^2$$

$$\sqrt{73} = \sqrt{c^2}$$

$$c = 8.54 \text{ m}$$

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

$$3^2 + 2^2 = c^2$$

$$c = 3.7$$

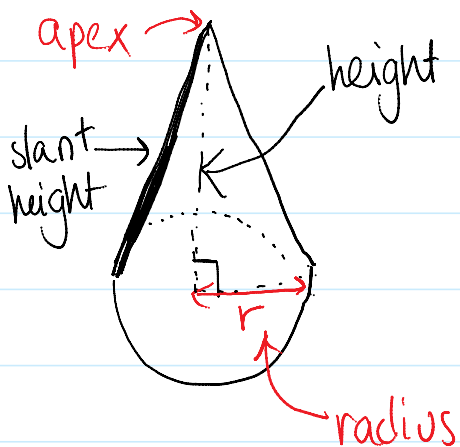
$$\begin{aligned} \text{SA triangle} &= \frac{1}{2}bh \\ \text{with 6cm base} &= \frac{1}{2}(6)(8.25) \\ &= 24.75 \times 2 \text{ triangular faces} \\ &= 49.5 \text{ m} \end{aligned}$$

$$\begin{aligned} \text{SA triangle} &= \frac{1}{2}bh \\ \text{with 4m base} &= \frac{1}{2}(4)(8.54 \text{ m}) \\ &= 17.08 \times 2 \\ &= 34.16 \text{ m} \end{aligned}$$

$$\begin{aligned} \text{SA}_{\text{base}} &= lw \\ &= 6 \times 4 = 24 \text{ m} \end{aligned}$$

$$\text{SA}_{\text{rectangular pyramid}} = 24 \text{ m} + 49.5 + 34.16 = \boxed{107.7 \text{ m}^2}$$

Right Circular Cone (Right Cone)



$$\text{SA} = \text{side} + \text{base}$$

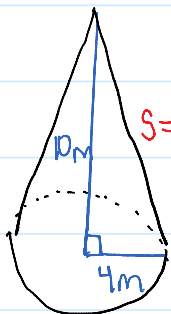
$$= \pi r s + \pi r^2$$

$$\boxed{\text{SA} = \pi r s + \pi r^2}$$



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

Ex. #2 A right cone has a base radius of 4m, and a height of 10m. Calculate SA?



* USE pythagorean Theorem *

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

$$10^2 + 4^2 = c^2$$

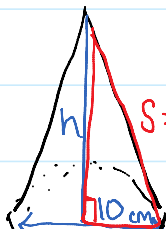
$$100 + 16 = c^2$$

$$\sqrt{116} = \sqrt{c^2}$$

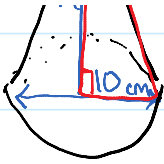
$$c = 10.77m$$

$$\begin{aligned} SA &= \pi r s + \pi r^2 \\ &= \pi(4)(10.77) + \pi(4)^2 \\ &= \boxed{185.6 \text{ m}^2} \end{aligned}$$

Ex. #4 The lateral area of a cone is 220 cm^2 . The diameter is 10 cm. Calculate height?

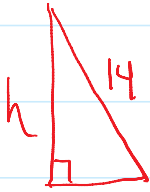


$$\begin{aligned} SA &= \pi r s + \cancel{\pi r^2} \\ &= 220 \end{aligned}$$



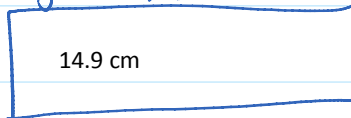
- 220

$$220 = \pi r s$$
$$\frac{220}{\pi 5} = \frac{\pi (5) s}{\pi 5}$$
$$14 = s$$

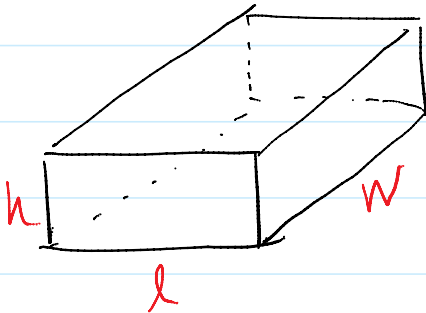


$$a^2 + b^2 = c^2$$

$$a^2 + 5^2 = 14^2$$



Rectangular Prism



$$SA = 2(wh + lw + lh)$$