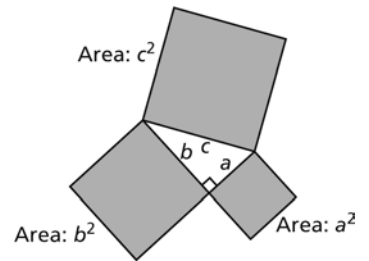


# Sec. 1.4- Surface Areas of Right Pyramids & Right Cones

## Remember: The Pythagorean Theorem

The Pythagorean Theorem states that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the legs.

We write:  $a^2 + b^2 = c^2$



- To determine the length of the hypotenuse when we know the lengths of the legs, substitute for  $a$  and  $b$  in the equation  $a^2 + b^2 = c^2$ .

Substitute:  $a = 3$  and  $b = 5$

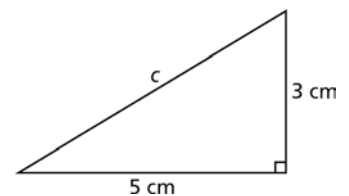
$$3^2 + 5^2 = c^2$$

$$9 + 25 = c^2$$

$$34 = c^2$$

$$c = \sqrt{34} \quad \text{Use a calculator.}$$

$$c = 5.8309 \dots$$



The length of the hypotenuse to the nearest tenth of a centimetre is 5.8 cm.

- To determine the length of a leg when we know the lengths of the other leg and the hypotenuse, substitute for  $a$  and  $c$  in the equation  $a^2 + b^2 = c^2$ .

Substitute:  $a = 1$  and  $c = 2$

$$1^2 + b^2 = 2^2$$

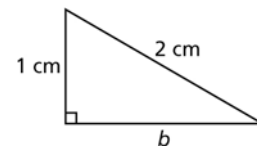
$$1 + b^2 = 4 \quad \text{Solve for } b.$$

$$b^2 = 4 - 1$$

$$b^2 = 3$$

$$b = \sqrt{3} \quad \text{Use a calculator.}$$

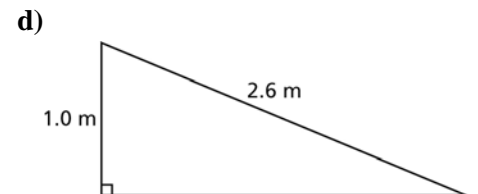
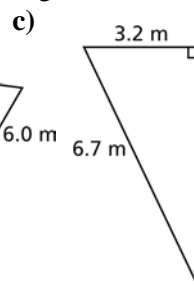
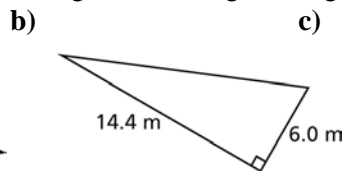
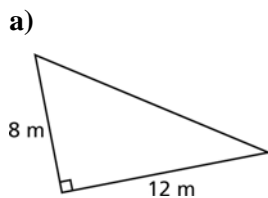
$$b = 1.7320 \dots$$



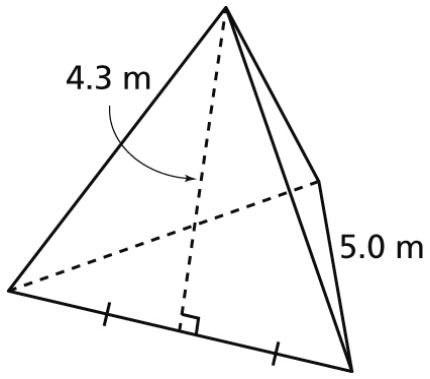
The length of the leg to the nearest tenth of a centimetre is 1.7 cm.

## Check Your Understanding

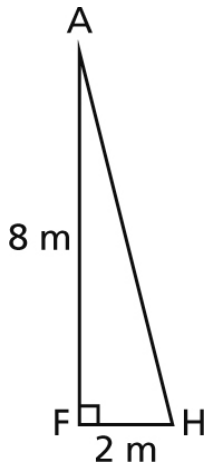
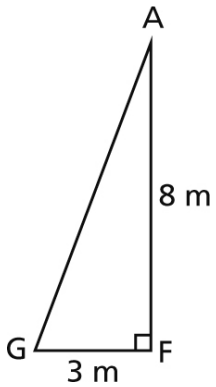
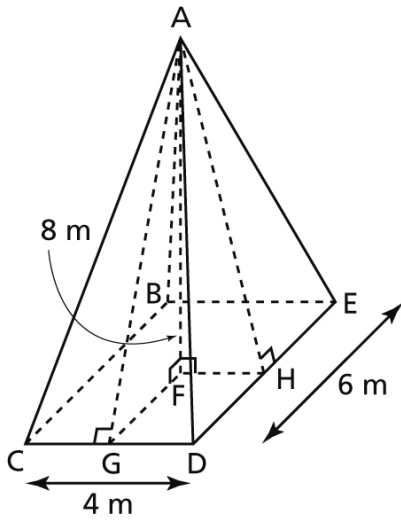
- Determine the unknown length in each right triangle to the nearest tenth of a metre.



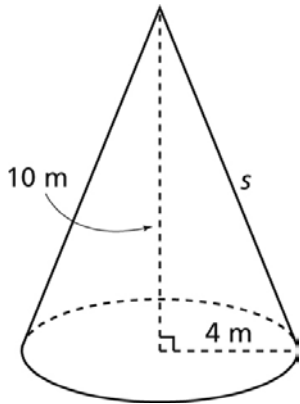
1. Calculate the surface area of this regular tetrahedron to the nearest square metre.



2. A right rectangular pyramid has base dimensions 4 m by 6 m, and a height of 8 m. Calculate the surface area of the pyramid to the nearest square metre.



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



4. A model of the Great Pyramid of Giza is constructed for a museum display. The surface area of the triangular faces is 3000 square inches. The side length of the base is 50 in. Determine the height of the model to a fraction of an inch.

