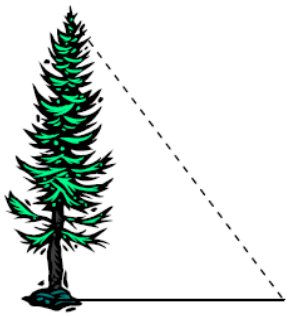
Example 2

Ryan wants to know the height of a tree on his lot. He stands 15 metres from the base of the tree and measures the angle of elevation from the ground to the top of the tree using a clinometer. He discovers that the angle of elevation is 53°. Determine the height of the tree.



Answer:

We will be assuming that the tree is vertical and therefore at a right-angle to the ground. For this question we need to find the opposite side using the tangent ratio.

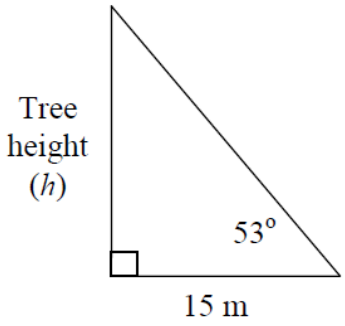
$$\tan\theta = \frac{\text{opp}}{\text{adj}}$$

$$\tan 53° = \frac{h}{15}$$

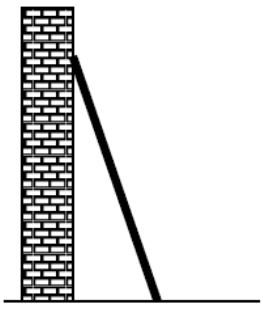
$$1.327 = \frac{h}{15}$$

$$1.327 \times 15 = h$$

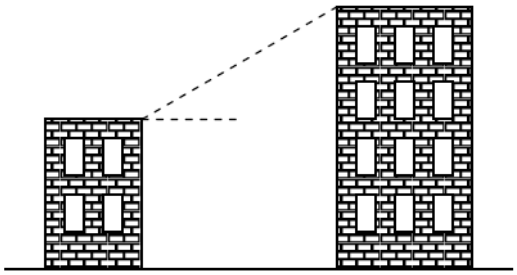
h = 19.9 metres



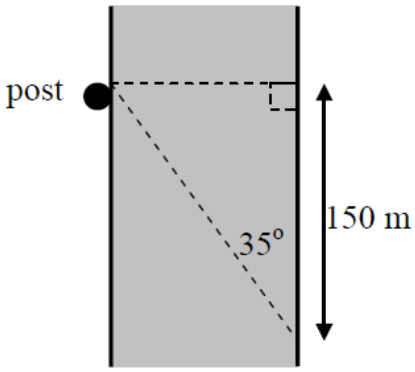
Taralee leans an 8 metre ladder against a vertical brick wall. If the base of the ladder is 1.2 metres from the brick wall, what angle does the ladder make with the ground?



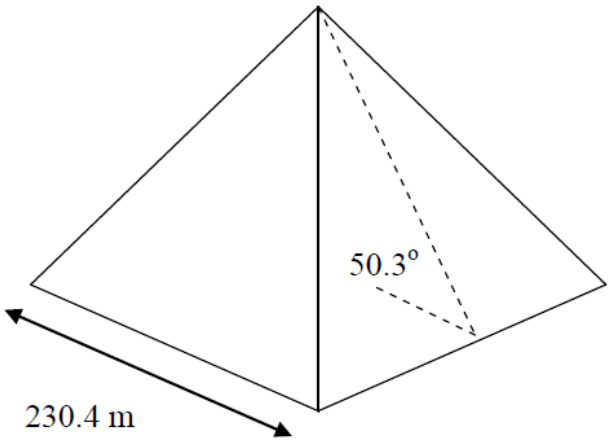
A video camera is mounted on the top edge of a 12.3 metre building. The camera faces another building directly across the road. If the camera is tilted up at 30° to the horizontal, it views the top edge of this other building. The bases of the buildings are 18 metres apart. How tall is the building directly across the street?



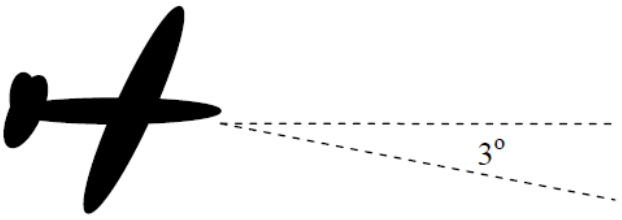
Jorell needs to figure out the width of a river. He uses a post located on the other side of the river and his knowledge of trigonometric ratios to accomplish this. He was able to take two measurements on his side of the river. These measurements are recorded on the diagram. Determine the width of the river.



The Pyramid of Khufu, completed in 2560 BC, is the oldest and largest of the three pyramids of Giza. It is a square based pyramid where the length of the base side is 230.4 m and the angle of elevation from the middle of the base side to the top of the pyramid is 50.3°. Determine the height of the pyramid.



The angle of descent for most passenger aircraft is 3°. If a plane is at an altitude of 5 miles, how far away from the airport (along a horizontal path) should the aircraft start its descent?



A flag and flag pole have been placed on the top of a tower. When one stands 40 m from the center of the base of the tower, the angle of elevation to the top of the tower is 54°. From the same position, the angle of elevation to the top of the flagpole is 56.5°. How tall is the flagpole?