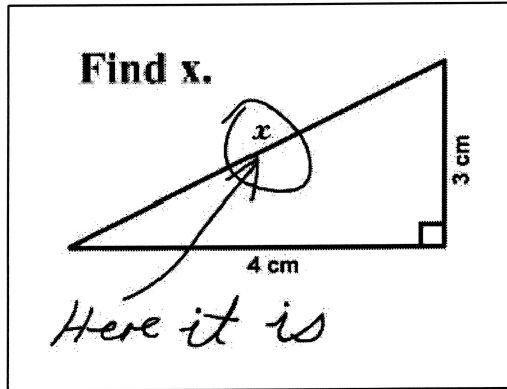


Practice Solving Side Lengths of Right Triangles



Solving equation by

$$\frac{1}{n} \sin x = ?$$

$$\frac{1}{n} \sin x =$$

$$six = 6$$

Recall: SOH CAH TOA

$$\sin \theta = \frac{\textit{opposite}}{\textit{hypotenuse}}$$

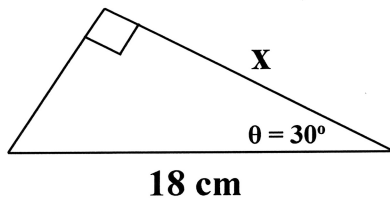
$$\cos \theta = \frac{\textit{adjacent}}{\textit{hypotenuse}}$$

$$\tan \theta = \frac{\textit{opposite}}{\textit{adjacent}}$$

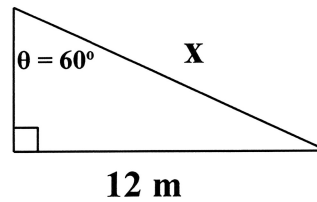
Examples

Determine the length of the side x in each diagram.

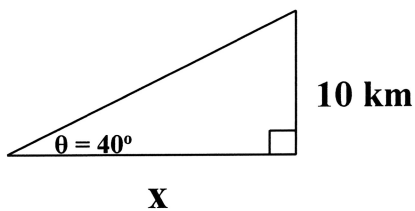
a)



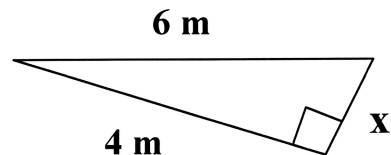
b)



c)



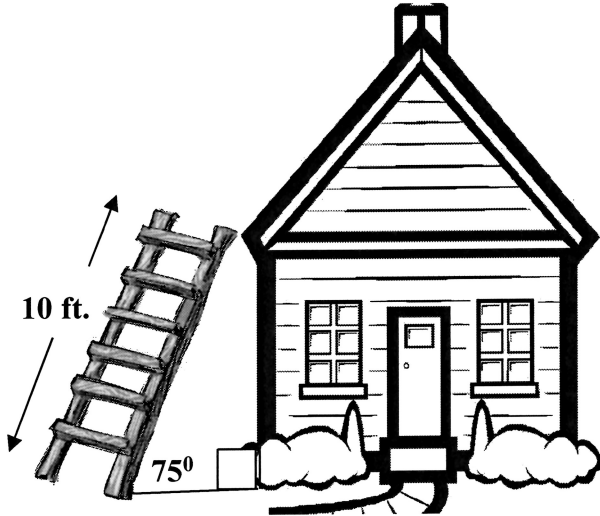
d)



Applications of Trigonometry

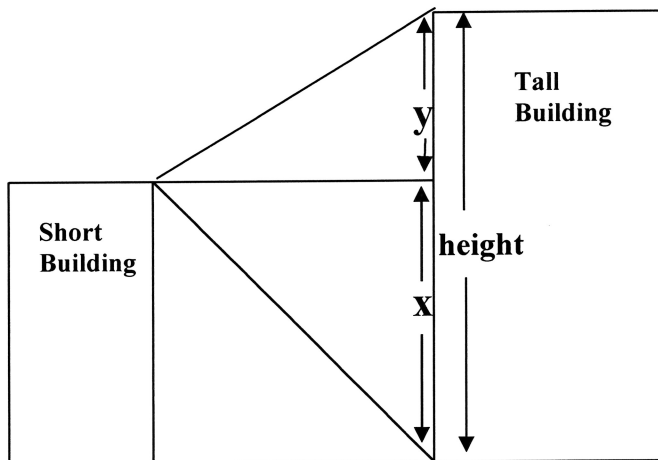
Example 1

A 10 foot ladder leans against a wall. The angle between the ladder and the ground is 75° . How high up the wall does the ladder reach?



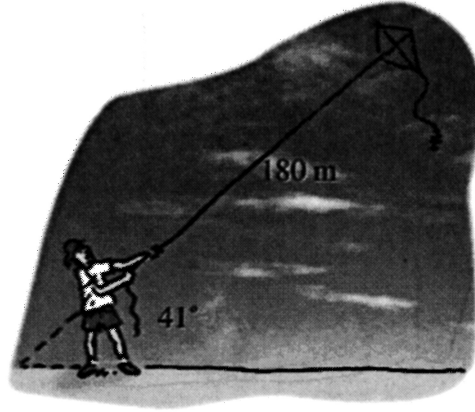
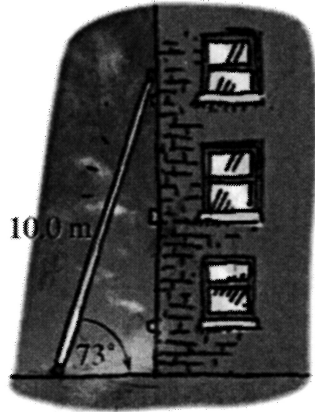
Example 2

Two buildings are 30 metres apart. From the top of the short building, the angle of elevation to the top of the tall building is 65° . From the top of the short building, the angle of depression to the bottom of the tall building is 40° . What is the height of the tall building?



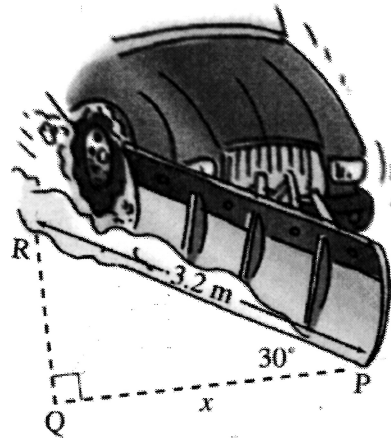
Applications of Trigonometry – Solving Side Lengths

1. A 10.0-m ladder leans against a vertical wall at an angle of 73° (below left).
 - a) Calculate the height the ladder reaches up the wall.
 - b) Calculate the distance from the foot of the ladder to the wall.



2. A kite has a string 180 m long (above right). The string makes an angle of 41° with the ground. Determine the height of the kite.

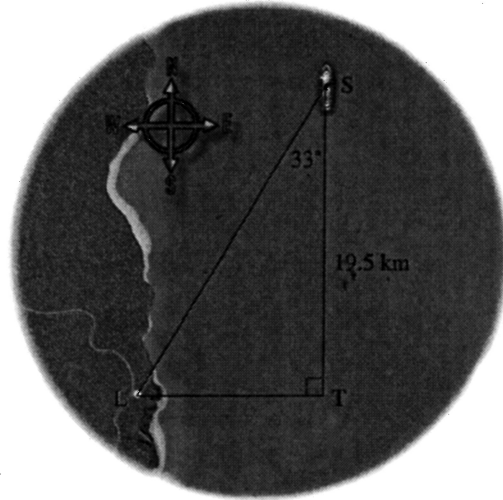
3. A snow plow has a 3.2-m blade set at an angle of 30° . How wide a path will the snow plow clear?



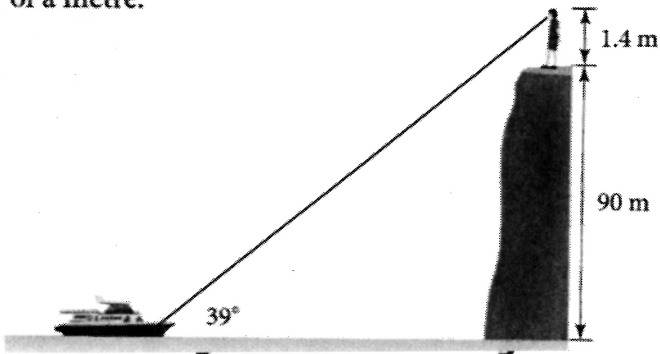
4. A storm causes some 14.0-m hydro poles to lean over. One pole leans at an angle of 72° to the ground. How high is the top of the pole from the ground?



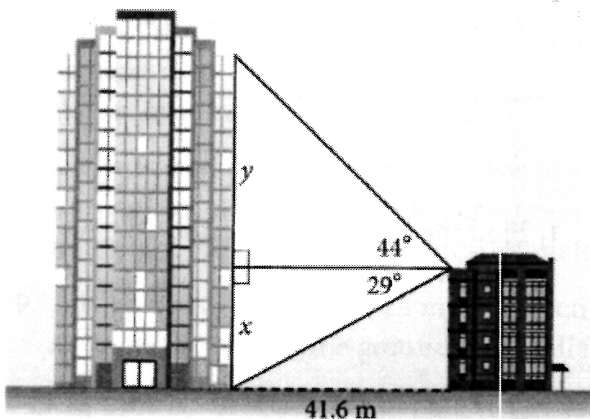
5. When a ship is at T, the navigator observes a lighthouse L due west on the shore. The ship sails 19.5 km north to point S. The navigator measures $\angle TSL$ and finds that it is 33° .
- How far is the ship from the lighthouse now?
 - Use the Pythagorean Theorem to calculate the distance LT.



6. The Cathedral Bluffs in Toronto, Ontario, are eroded sandstone cliffs that rise 90 m above Lake Ontario. Natalie is 1.4 m tall. From her position at the top of the cliffs, the angle between the surface of the lake and her line of sight to a boat is 39° . Find the distance between the boat and the base of the cliffs to the nearest tenth of a metre.



7. Two buildings are 41.6 m apart. From the roof of the shorter building, the angle of elevation to the top of the taller building is 44° and the angle of depression to the base of the taller building is 29° . Find the heights of the buildings to the nearest tenth of a metre.



Answers:

- a) 9.6 m b) 2.9 m
- 118.1 m
- 2.8 m
- 13.3 m
- a) 23.3 km b) 12.7 km
- 111.1 m
- short building = 23.1 m,
tall building = 63.2 m