

0.6 Finding Angles and Solving Right Triangles Notes

There are 3 ways to solve a right triangle ...

Pythagoras

Trig (sin, cos, tan)

180° Rule = 3 angles in a triangle add to 180°

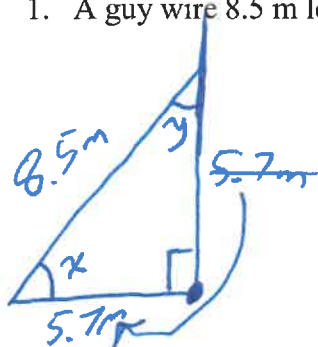


the two non-right angles
add to 90°

Type 1 - Solving for the Angle

Using SOH CAH TOA, or all angles = 180, to find the missing angles.

1. A guy wire 8.5 m long is attached 5.7 m from the base of a pole.



$$\cos = \frac{A}{H}$$

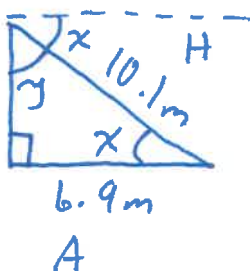
$$\cos x = \frac{5.7m}{8.5m}$$

$$x = 48^\circ$$

y

$$90 - 48 = 42^\circ$$

2. What is the angle of depression from a point 10.1 m down a hill if the horizontal distance is 6.9 m? What is the other angle created, to the nearest degree?



$$\cos = \frac{A}{H}$$

$$\cos x = \frac{6.9m}{10.1m}$$

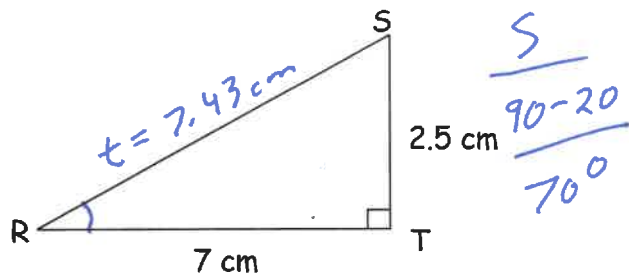
$$x = 47^\circ$$

y

$$90 - 47 = 43^\circ$$

Type 2 – Solving a Right Triangle

Solve all missing parts of the triangle.



$$\text{leg}^2 + \text{leg}^2 = \text{hyp}^2$$

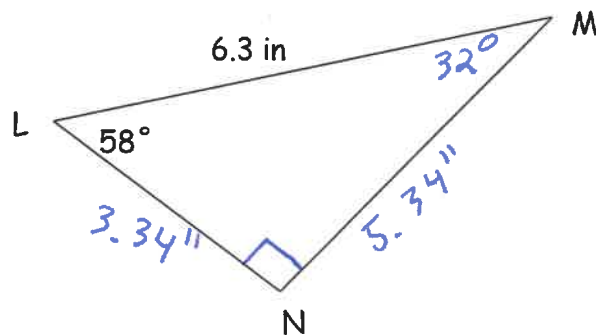
$$7^2 + 2.5^2 = t^2$$

$$t = 7.43 \text{ cm}$$

$$\frac{R}{\tan} = \frac{O}{A}$$

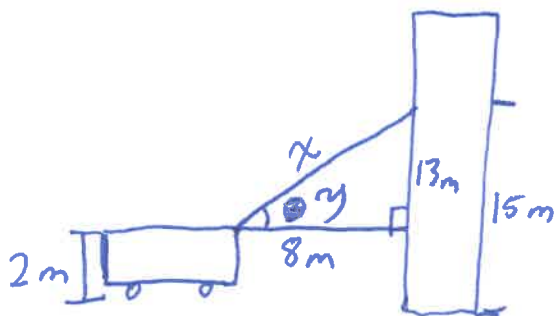
$$\tan R = \frac{2.5 \text{ cm}}{7 \text{ cm}}$$

$$R = 20^\circ$$



The Commodity Exchange Building in Winnipeg is 117 m tall. Peter is a telescopic crane operator who has been hired to do some repairs to the building's exterior. The base of the crane is 2 m tall and it is positioned 8 m away from the building. He extends the extension cylinder, or arm, of the crane until its tip is positioned 15 m up the side of the building.

How long must the extension cylinder be to reach the side of the building?



$$\text{leg}^2 + \text{leg}^2 = \text{hyp}^2$$

$$8^2 + 13^2 = x^2$$

$$15.26 \text{ m} = x$$



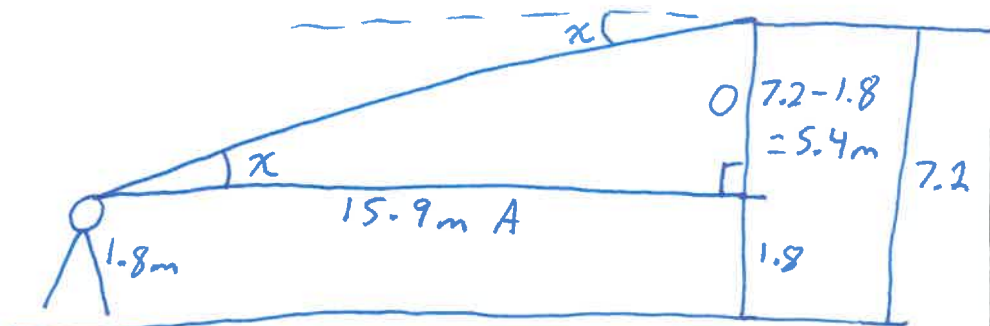
What is the angle of elevation of the crane's extension cylinder?

$$\tan = \frac{O}{A}$$

$$\tan y = \frac{13 \text{ m}}{8 \text{ m}}$$

$$y = 58^\circ$$

Jane is a surveyor working near North Battleford, SK. She looks through her theodolite, which is 1.8 m high, and sights to the top of a small rock bluff. The base of the rock bluff is 15.9 m away. Jane determines that the bluff is 7.2 m tall. What is the angle of depression from the top of the bluff to Jane's theodolite?



$$\tan = \frac{o}{A}$$

$$\tan x = \frac{5.4}{15.9}$$

$$x = 19^\circ$$

