

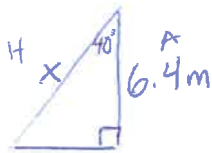
1.2 Solving Complex Problems in the Real World Notes

Working with two or more triangles:

Sometimes when working with a problem, you have to break the situation down to two or more triangles and work in steps to solve it. You may need to use values from one triangle to solve another right triangle that shares a common edge

Round all lengths to the nearest hundredth and angles to the nearest degree!

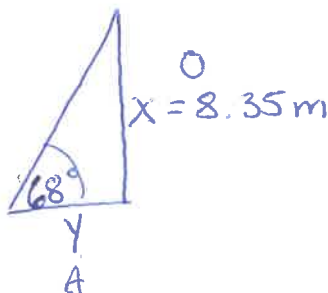
Ex. 1: Solve for x and y .



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

$$\cos 40 = \frac{6.4}{x}$$

$$x = 8.35 \text{ m}$$



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

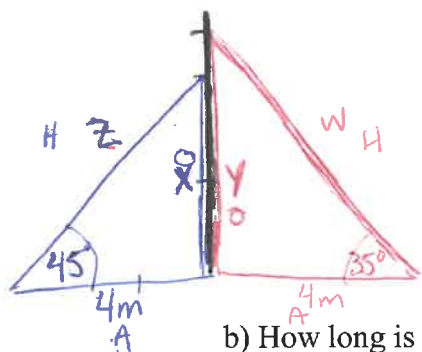
$$\tan 68 = \frac{8.35}{y}$$

$$y = 3.37 \text{ m}$$

Ex. 2

A flagpole is supported by two guy wires, each attached to a peg in the ground 4 m from the base of the pole. The guy wires have angles of elevations of 35° and 45° .

a) How much higher up the flagpole is the top guy wire attached?



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

$$\tan 35 = \frac{y}{4}$$

$$y = 2.80 \text{ m}$$

$$\tan 45 = \frac{x}{4}$$

$$x = 4 \text{ m}$$

$$x - y = 4 \text{ m} - 2.80 \text{ m} = 1.2 \text{ m}$$

b) How long is each guy wire?

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

$$\cos 45 = \frac{4}{z}$$

$$z = 5.66 \text{ m}$$

$$\cos 35 = \frac{4}{w}$$

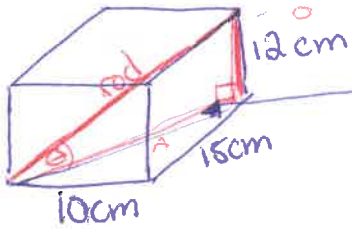
$$w = 4.88 \text{ m}$$

Working with triangles in three dimensions

In some situations, you may need to work with triangles that are at an angle to each other and share common edges.

Ex. 3

A box is 10 cm by 12 cm by 15 cm. What is the length of the longest rod that can be carried in it? What angle does it make with the bottom?



$$\text{hyp} = \sqrt{(10\text{ cm})^2 + (15\text{ cm})^2}$$

$$\text{hyp} = 18.03\text{ cm}$$

$$\text{rod} = \sqrt{(18.03\text{ cm})^2 + (12\text{ cm})^2}$$

$$\boxed{\text{rod} = 21.66\text{ cm}}$$

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

$$\tan \theta = \frac{12\text{ cm}}{18.03\text{ cm}}$$

$$\boxed{\theta = 34^\circ}$$