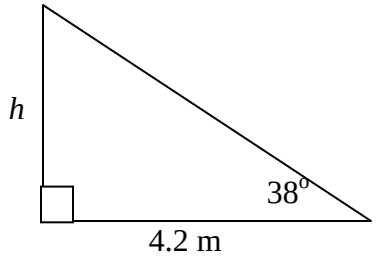
Day 2 – Applications of the Primary Trig Ratios

As a class, work through the word problems that follow (or similar problems) to consolidate understanding of primary trig ratios and apply these trig ratios to real world contexts.

Later in the class, students will complete a formative quiz on primary trig ratios.

Finally, students will work through word problems on the handout "Applying Trigonometry". One of these problems includes two triangles in two dimensions.

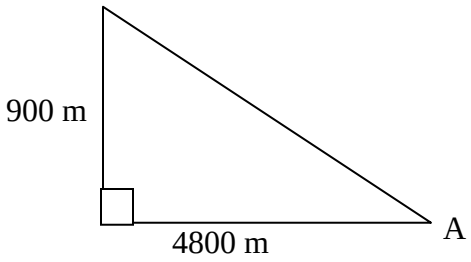
Example: The frame of a trailer casts a shadow 4.2 m long when the sun's rays are at an angle of 38° to the ground. How tall is the trailer?



$$\tan 38 = \frac{h}{4.2}$$
$$h = 4.2 \tan 38$$
$$\cong 3.28$$

$\therefore$ The trailer is 3.28 m tall.

Example: In order to safely land, a plane approaching the airport runway should have an angle measurement of no more than 10°. A plane is at an altitude of 900 m. The plane is a horizontal distance of 4.8 km from the start of the runway. Is it safe for the plane to land?



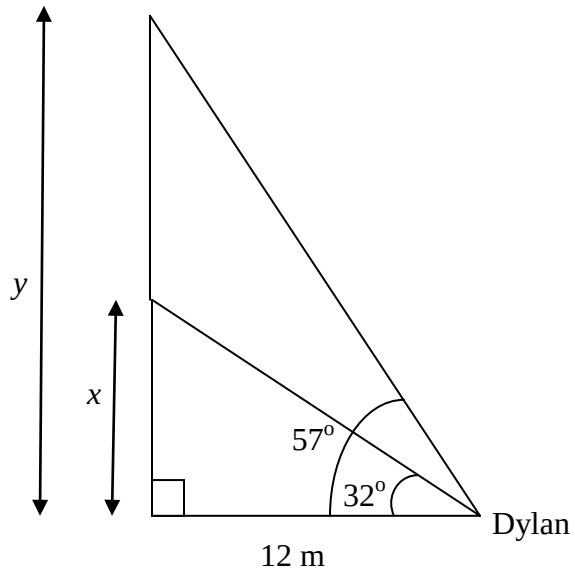
$$\tan A = \frac{900}{4800}$$
$$A = \tan^{-1}\left(\frac{900}{4800}\right)$$
$$\cong 10.6^{o}$$

$\therefore$ It is not safe for the plane to land.

Example: Dylan loves to shoot action film of his friends in action using his movie camera! He is standing 12 m away from the wall where his friend, Stephanie, is rock climbing. When Dylan begins to film, the angle of elevation of the focus of the camera is 32°. When he stops filming the angle of elevation is 57°. What distance, to the nearest metre, did Stephanie climb during that time?

Let x represent Stephanie's height off the ground when Dylan begins filming.

Let y represent Stephanie's height off the ground when Dylan stops filming.



$$\tan 32 = \frac{x}{12}$$
$$x = 12\tan 32$$
$$\cong 7.498$$

$$\tan 57 = \frac{y}{12}$$
$$y = 12\tan 57$$
$$\cong 18.478$$

$$\text{distance} = y - x$$
$$\cong 18.478 - 7.498$$
$$\cong 10.98$$

$\therefore$ Stephanie climbed 11m.