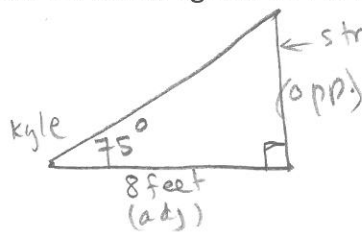


Lesson Six: Applications of the Trigonometric Ratios

Goals:

- Solve word problems that involve right triangle relationships, including:
 - the 180° rule.
 - the Pythagorean Theorem.
 - the 3 trigonometric ratios.

Example 1 Kyle stands 8 feet from the base of a street light. The angle of elevation from the ground to the top of the street light is 75°. What is the height of the street light?



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

$$\tan 75 = \frac{\text{opp}}{8}$$

$$8 \tan 75 = \text{opp}$$

$$\underline{\text{Street light} = 29.86 \text{ feet}}$$

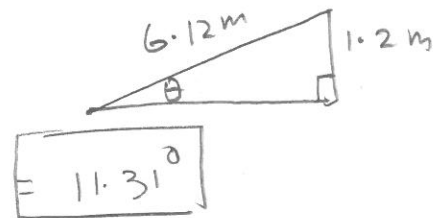
Example 2 A 6.12 m long conveyor belt reaches a height of 1.2 metres at its higher end. Determine the angle of inclination.

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\sin \theta = \frac{1.2}{6.12}$$

Calculator input: $\boxed{2\text{nd}} \boxed{\sin} \boxed{1.2} \boxed{\div} \boxed{6.12} \boxed{)} \boxed{\text{ENTER}}$

Angle of inclination = $\boxed{11.31^\circ}$

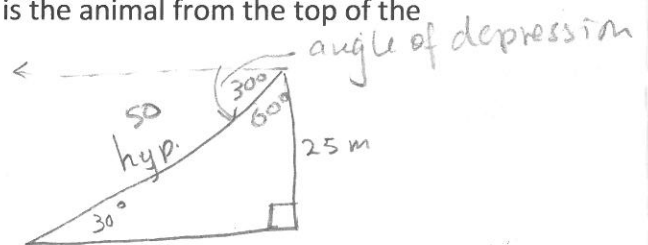


Example 3. The angle of depression from the top of a viewing tower to an animal on the ground is 30°. The height of the tower is 25 metres. How far is the animal from the top of the viewing tower?

① using: $\sin \theta = \frac{\text{opp}}{\text{hyp}}$

② $\sin 30^\circ = \frac{25}{\text{hyp}}$

$$\text{hyp} = \frac{25}{\sin 30^\circ} \Rightarrow \underline{\underline{50 \text{ m}}}$$



the animal is 50 m from the top of the viewing tower