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*Remember to print Monday's lesson in advance.*

## Today's Learning Goal(s):

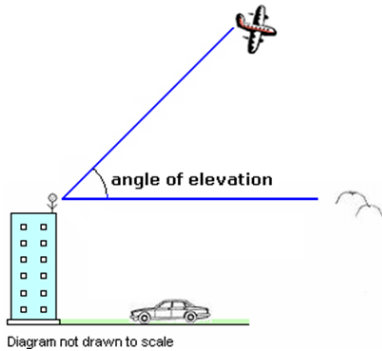
By the end of the class, I will be able to:

- a) Correctly identify an angle of elevation and an angle of depression.
- b) Use the primary trig ratios to solve real world applications.

## MBF 3CI 1.2 Solve Problems using the Primary Trig Ratios

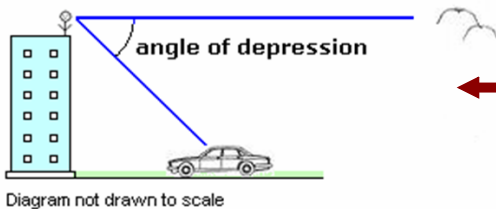
Date: Sept-8/17

Recall: The **angle of elevation (inclination)** is the angle of view from a horizontal line segment **up** to the object being viewed.



← Sketch this example onto your handout.

The **angle of depression** is the angle between the horizontal line segment and the line of sight **down** to an object.



← Sketch this example onto your handout.

**Method:**

Name the sides based on the indicated angle (sketch first if necessary).

Choose the correct Trig ratio using SOH, CAH, TOA (based on the given information from the diagram).

Write the Trig equation, then ISOLATE the variable.

Use a calculator to solve the equation.

Round your **final** answer, and give a concluding ( ) statement (including units).

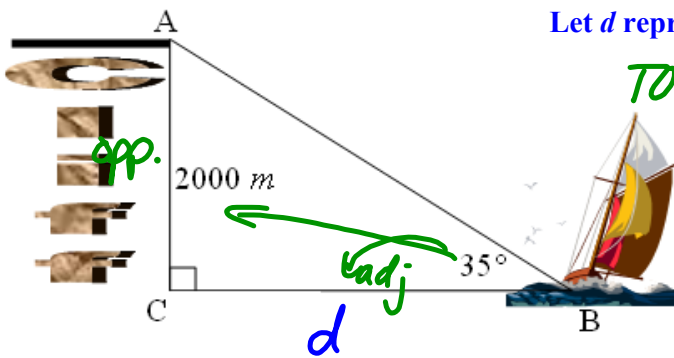
Ex. 1 A sailboat is approaching a cliff.

The angle of elevation from the sailboat to the top of the cliff is  $35^\circ$ .

The height of the cliff is known to be about 2000 m.

Determine the distance from the sailboat to the base of the cliff.

Round the **final** answer to the nearest **tenth**.



Let  $d$  represent the distance from the boat to the cliff, in m.

$$d(\tan 35^\circ) = \frac{2000}{d}d$$

$$\frac{d \cancel{\tan 35^\circ}}{\cancel{\tan 35^\circ}} = \frac{2000}{\tan 35^\circ}$$

$$d = \frac{2000}{\tan 35^\circ}$$

$$\approx 2856.29$$

$$\approx 2856.3 \text{ m}$$

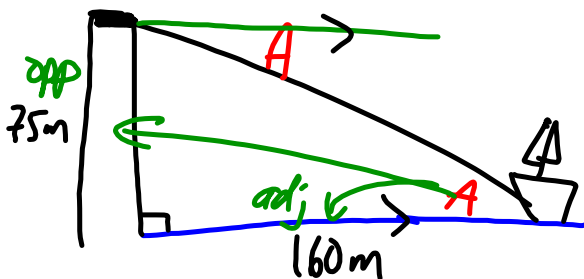
$\therefore$  the boat is 2856.3m from the cliff.

$$\tan 35^\circ = \frac{2000}{d}$$

$$d = \frac{2000}{\tan 35^\circ}$$

- Ex. 2 A surveyor on the edge of a cliff spots a boat on the lake below. The boat is 160 m away from the cliff. If the cliff is 75 m above the shore of the lake, determine the angle of depression (to the nearest degree) from the surveyor to the boat. Include a sketch.

Let  $A$  represent the angle of depression in degrees.



TOA

$$\tan A = \frac{75}{160}$$

$$A = \tan^{-1}\left(\frac{75}{160}\right)$$

$$\approx 25.1$$

$$\approx 25^\circ$$

$\therefore$  the angle of depression is  $25^\circ$

**Ex#3** You will see three types of trig equations. (Solve each to 1 decimal place).

- a) the variable on the top) the variable on the bottom) the variable is the angle

$$\tan 55^\circ = \frac{x}{8}$$

$$x = 8 \times \tan 55^\circ$$

$$\Rightarrow x \approx 11.42$$

$$\Rightarrow x \approx 11.4 \text{ cm}$$

$$\sin 35^\circ = \frac{4.3}{y}$$

$$y = \frac{4.3}{\sin 35^\circ}$$

$$\Rightarrow y \approx 7.49$$

$$\Rightarrow y \approx 7.5 \text{ cm}$$

$$\cos Z = \frac{2.9}{5.6}$$

$$Z = \cos^{-1}\left(\frac{2.9}{5.6}\right)$$

$$\Rightarrow Z \approx 58.81$$

$$\Rightarrow Z \approx 58.8^\circ$$

**Review the learning goals. Were we successful today?**

Note: For #14 in the homework, you need to find the horizontal distance the plane must travel.

**Be ready for a quiz next class on SOH, CAH, TOA, and another PT question.**

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