

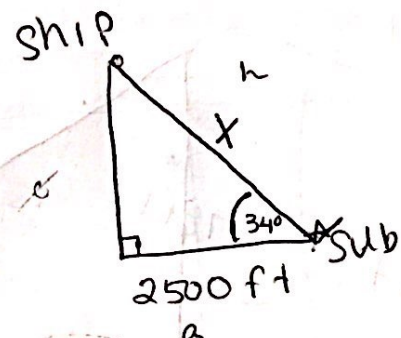
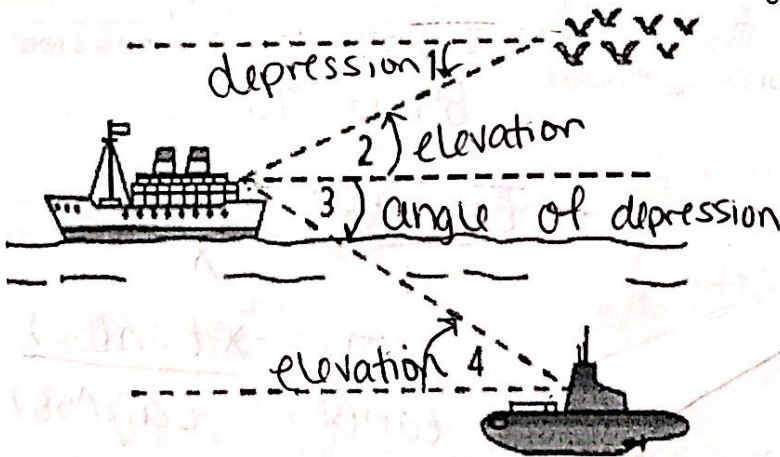
SOH-CAH-TOA

Main Ideas/Questions	Notes	8.4 Regular
<h2>Angle of Elevation</h2>	<p>When looking UP to an object, the angle of elevation is formed by an <u>observer's line of sight</u> and a <u>horizontal</u>.</p>	
<h2>Angle of Depression</h2>	<p>When looking DOWN to an object, the angle of depression is formed by an <u>observer's line of sight</u> and a <u>horizontal</u>.</p> <p>The angle of depression is congruent to the angle of elevation because they are <u>alt-int angles</u>.</p>	

Identifying Angles of Elevation and Depression

Describe each angle as it relates to the situation in the diagram.

- Label the angles of elevation and depression.
- If the angle of elevation from the submarine to the ship is 34° , and the horizontal distance from the ship to the submarine is 2,500 feet, find the direct distance from the ship to the submarine.



$$\frac{\cos(34)}{1} = \frac{2500}{x}$$

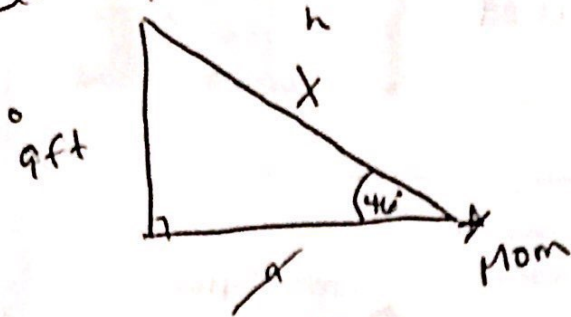
$$\frac{2500}{\cos(34)} = \frac{x \cos(34)}{\cos(34)}$$

$$x = 3015.5 \text{ ft}$$

Examples: Draw and label a diagram, then solve for the missing part. Round to the nearest tenth.

1. Leah's mom is standing at the bottom of the slide, waiting for Leah to slide down. If the angle of elevation from the bottom of the slide to the top is 46° , and the slide has a vertical height of 9 feet, find the length of the slide.

Leah

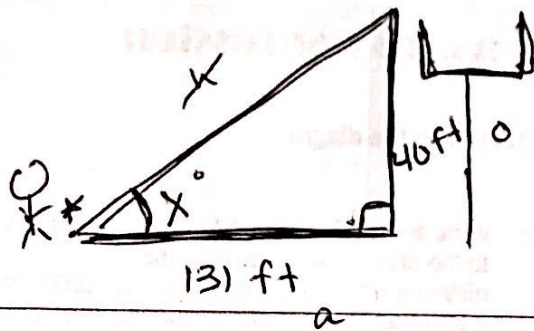


$$\frac{\sin(46)}{1} = \frac{9}{x}$$

$$\frac{9}{\sin(46)} = \frac{x \sin(46)}{\sin(46)}$$

$$x = 12.5 \text{ ft}$$

2. A football kicker stands 131 feet from the base of a goal post. If the goal post is 40 feet tall, what is the angle of elevation from the kicker's foot to the top of the goal post.

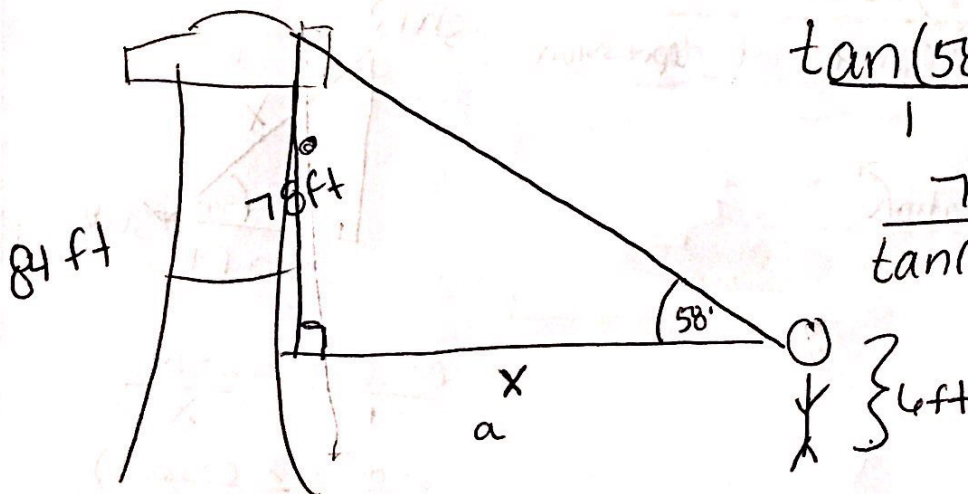


$$\tan(x) = \frac{40}{131}$$

$$x = \tan^{-1}\left(\frac{40}{131}\right)$$

$$x = 17.0^\circ$$

3. Casey sights the top of an 84 foot tall lighthouse at an angle of elevation of 58° . If Casey is 6 feet tall, how far is he standing from the base of the lighthouse?



$$84 - 6 = 78$$

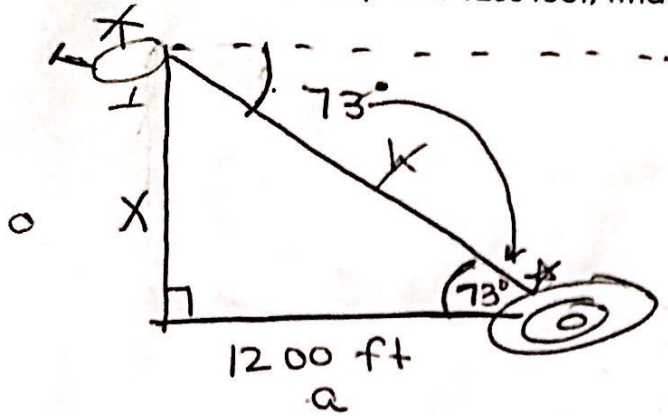
$$\frac{\tan(58)}{1} = \frac{78}{x}$$

$$\frac{78}{\tan(58)} = \frac{x \tan(58)}{\tan(58)}$$

$$x = 48.7 \text{ ft}$$

Examples: Draw and label a diagram, then solve for the missing part. Round to the nearest tenth.

4. A pilot in a helicopter spots a landing pad below. If the angle of depression is 73° and the horizontal distance to the pad is 1200 feet, what is the altitude of the helicopter?

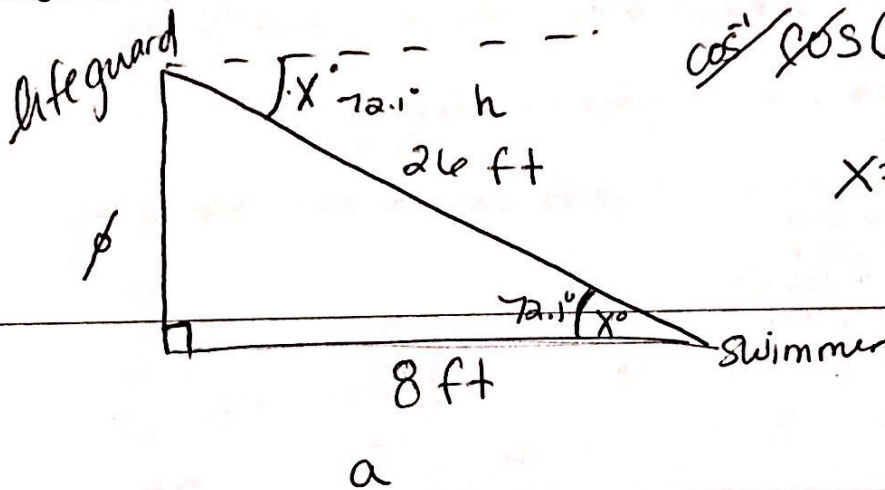


$$\frac{\tan(73)}{1} = \frac{X}{1200}$$

$$X = 1200 \tan(73)$$

$$X = 3925.0 \text{ ft}$$

5. A lifeguard is sitting on a platform, looking down at a swimmer in the water. If the swimmer is 8 feet from the base of the platform and the lifeguard is directly 26 feet from the swimmer. What is the angle of depression at which the lifeguard spots the swimmer?



$$\frac{\cos^{-1}(8/26)}{\cos(x)} = \frac{8}{26}$$

$$X = \cos^{-1}(8/26)$$

$$X = 72.1^\circ$$

6. Building A is 480 feet tall and Building B is 654 feet tall. If the angle of depression from the top of Building B to the top of Building A is 42° , how far apart are the buildings?

$$\frac{\tan(42)}{1} = \frac{174}{X}$$

$$174 = X \tan(42)$$

$$\frac{174}{\tan(42)} = \frac{X \tan(42)}{\tan(42)}$$

$$X = 193.2 \text{ ft}$$

A

480 ft

X a

654 ft

B

$$\left. \begin{array}{r} 654 \\ - 480 \\ \hline 174 \end{array} \right\}$$