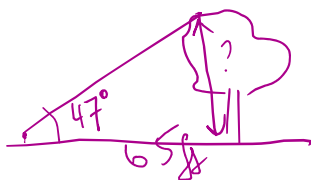


Section 2.2. Applications of trigonometric functions.

Problem 1.

Jake needs to determine the height of a tree near his house. From 65 feet from the base of the tree, the angle of elevation to the top of the tree and it was 47 degrees. What is the height of the tree? (Round to the nearest hundredth)

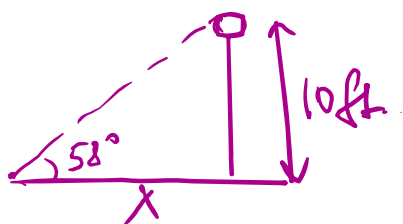


$$\tan 47^\circ = \frac{x}{65}$$

$$x = 65 \cdot \tan 47^\circ \approx 69.70 \text{ ft}$$

Problem 2.

Find the length of a shadow cast by a 10-foot lamp post when the angle of elevation of the sun is  $58^\circ$ . Round to the nearest tenth of a foot.

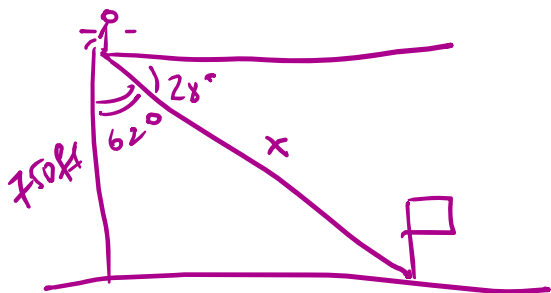


$$x \cdot \tan 58^\circ = \frac{10}{x} \cdot x$$

$$x = \frac{10}{\tan 58^\circ} \approx 6.25 \text{ ft}$$

Problem 3.

If a man is just about to ski down a steep mountain. He estimates the angle of depression from where he is now to the flag at the bottom of the course to be  $28^\circ$ . He knows that he is 750 feet higher than the base of the course. How long is the path that he will ski? Round to the nearest foot.



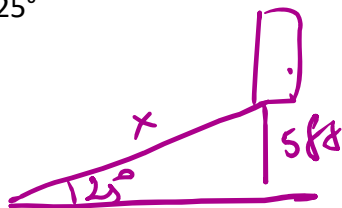
$$90^\circ - 28^\circ = 62^\circ$$

$$\cos 62^\circ = \frac{750}{x}$$

$$x = \frac{750}{\cos 62^\circ} \approx 1597.5 \text{ ft.}$$

Problem 4.

Your neighbor is to construct a ramp to his front door to make it wheelchair-accessible. How long does the ramp need to be if the door is 5ft above the ground level and the angle of elevation is  $25^\circ$



$$\sin 25^\circ = \frac{5}{x}$$

$$x = \frac{5}{\sin 25^\circ} \approx 11.83$$

Problem 5.

An observer standing on the top of a vertical cliff spots a house in the adjacent valley at an angle of depression of  $15^\circ$ . The cliff is 50m tall. How far is the house from the base of the cliff?



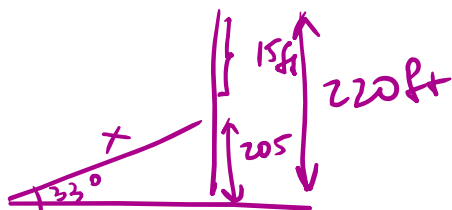
$$90^\circ - 15^\circ = 75^\circ$$

$$\tan 75^\circ = \frac{x}{50}$$

$$x = 50 \cdot \tan 75^\circ \approx 186.60 \text{ m}$$

Problem 6.

A radio transmission tower is 220 feet tall. How long should a guy wire be if it is to be attached 15 feet from the top and is to make an angle of  $33^\circ$  with the ground? Give your answer to the nearest hundredth of a foot.



$$220 - 15 = 205 \text{ ft}$$

$$\sin 33^\circ = \frac{205}{x}$$

$$x = \frac{205}{\sin 33^\circ} \approx 376.40 \text{ ft}$$