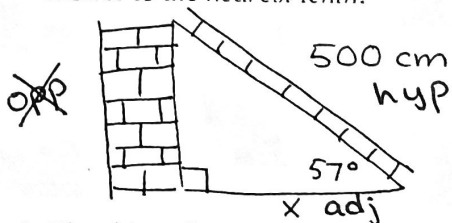


Name: _____ Period: _____ Date: _____

4-1 Right Triangle Trigonometry Word Problems

Step 1: Draw a triangle.
Step 2: Label the triangle using the given information.
Step 3: Create and solve an equation to find the missing side or angle.

1. A ladder, 500 cm long, leans against a building. If the angle between the ground and the ladder is 57 degrees, how far from the wall is the bottom of the ladder? Round the answer to the nearest tenth.

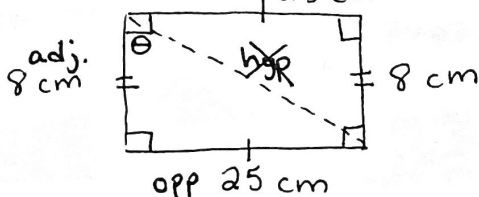


$$\cos(57) = \frac{x}{500}$$

$$x = 500 \cos(57)$$

$$x = 272.32 \text{ cm}$$

2. The sides of a rectangle are 25 cm and 8 cm. What is the measure, to the nearest degree, of the angle formed by the short side and a diagonal of the rectangle?

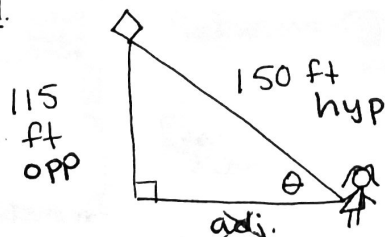


$$\tan(\theta) = \frac{25}{8}$$

$$\theta = \tan^{-1}\left(\frac{25}{8}\right)$$

$$\theta = 72.26^\circ \rightarrow \theta = 72^\circ$$

3. A kite is flying 115 ft above the ground. The length of the string to the kite is 150 ft, measured from the ground. Find the angle, to the nearest degree, that the string makes with the ground.

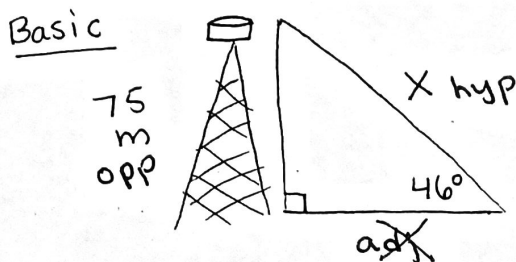


$$\sin(\theta) = \frac{115}{150}$$

$$\theta = \sin^{-1}\left(\frac{115}{150}\right)$$

$$\theta = 50.06 \rightarrow 50^\circ$$

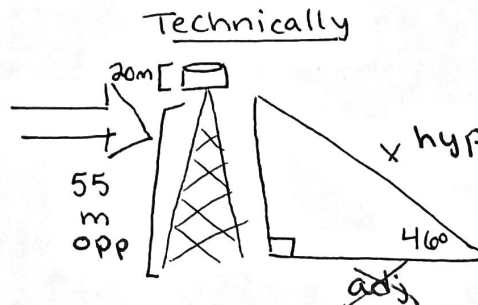
4. An observation tower is 75 m high. A support wire is attached to the tower 20 m from the top. If the support wire and the ground form an angle of 46 degrees, what is the length of the support wire, to the nearest tenth?



$$\sin(46) = \frac{75}{x}$$

$$75 = \frac{\sin(46) \cdot x}{\sin(46)}$$

$$x = 104.26 \text{ m}$$

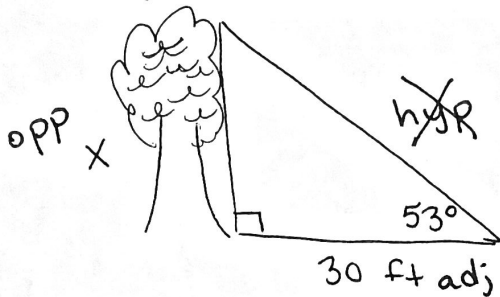


$$\sin(46) = \frac{55}{x}$$

$$55 = \frac{\sin(46) \cdot x}{\sin(46)}$$

$$x = 76.46 \text{ m}$$

5. At a point 30 feet from the base of a tree, the angle formed with the ground looking to the top measures 53° . Find, to the nearest foot, the height of the tree.

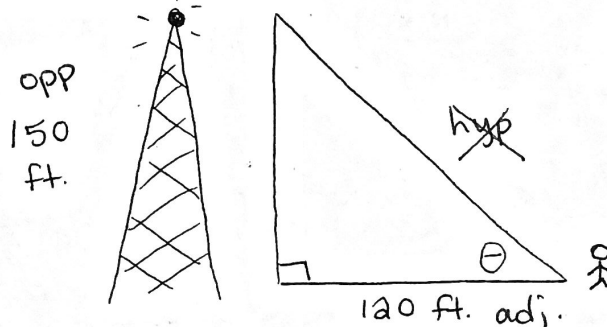


$$\frac{\tan(53)}{1} = \frac{x}{30}$$

$$x = 30 \tan(53)$$

$$x = 39.8 \rightarrow x = 40 \text{ ft}$$

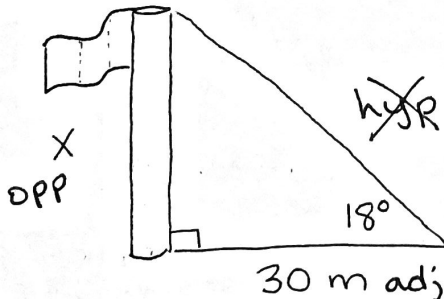
6. An observer is 120 feet from the base of a television tower, which is 150 feet tall. Find, to the nearest degree, the angle of elevation of the top of the tower from the point where the observer is standing.



$$\tan(\theta) = \frac{150}{120}$$

$$\theta = 51.34^\circ \rightarrow 51^\circ$$

7. The angle of elevation of the top of a flagpole from a point on the ground 30 meters from the base of the flagpole is 18 degrees. What is the height of the flagpole, to the nearest meter?

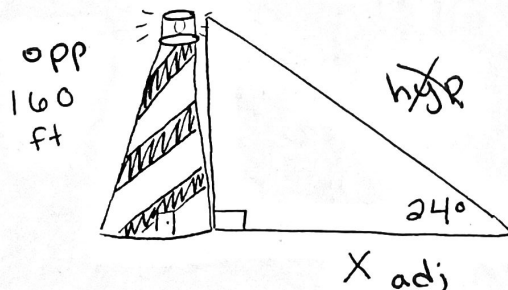


$$\frac{\tan(18)}{1} = \frac{x}{30}$$

$$x = 30 \tan(18)$$

$$x = 9.7 \rightarrow x = 10 \text{ m}$$

8. From the top of a lighthouse 160 feet high, the angle of depression of a boat out at sea is 24° . Find, to the nearest foot, the distance from the boat to the foot of the lighthouse. (The foot of the lighthouse is at sea level.)



$$\frac{\tan(24)}{1} = \frac{160}{x}$$

$$160 = \frac{\tan(24) \cdot x}{\tan(24)}$$

$$359.37 = x$$

$$\rightarrow x = 359 \text{ ft}$$