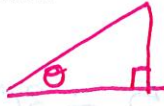



Name: _____

Date: _____

Triangle Application Problems - SOHCAHTOA

Angle of Elevation 		Angle of Depression 	
Key Words: look up, elevation, ascend		Key Words: descends, land,	
Vertical	Horizontal	Diagonal	

Determine whether each scenario would represent an angle of elevation or an angle of depression.

- Ava looks at a bird in a tree **elevation**
- Josh climbs up a mountain and looks down at the river below **depression**
- A plane is preparing to land on a runway **depression**
- Beth is flying a kite in the park **elevation**

Determine if each scenario would represent a horizontal, vertical or diagonal distance.

- The height of a building **vertical**
- The length of a runway **horizontal**
- The string of a kite **diagonal**
- Distance from the base of a tree to a person **horizontal**
- The altitude of a plane **vertical**
- A rocket launched at an angle **diagonal**

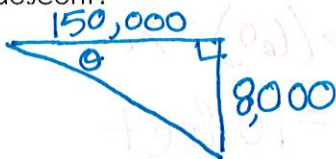
1. A skier drops 51m vertically while skiing down a 120 m ramp. What is the angle of elevation?



$$\sin \theta = \frac{51}{120}$$

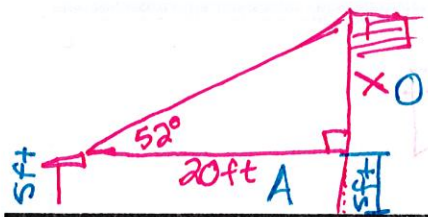
$$\theta = \sin^{-1}\left(\frac{51}{120}\right) = 25.2^\circ$$

2. A plane is 8000 ft above the ground. If the ground distance to the runway is 150,000 ft, what is the angle of descent?



$$\theta = 3.1^\circ$$

3. A telescope is mounted 5 ft above the ground. The telescope is tilted at a 52° angle above the horizontal to see the top of a flagpole. The two are 20 ft apart. How tall is the flagpole?

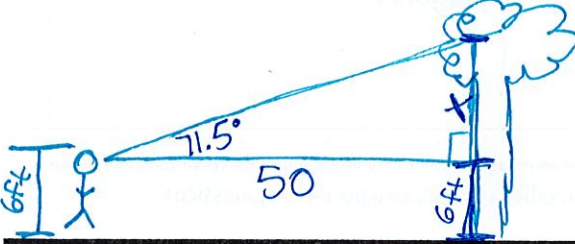


$$20 \cdot \tan(52) = \frac{X}{20} \cdot 20$$

$$X = 25.6$$

$$25.6 + 5 = 30.6 \text{ ft}$$

4. A 6 ft tall bird watcher is standing 50 ft from the base of a large tree. The surveyor measures the angle of elevation to a bird on top of the tree as 71.5°. How tall is the tree?

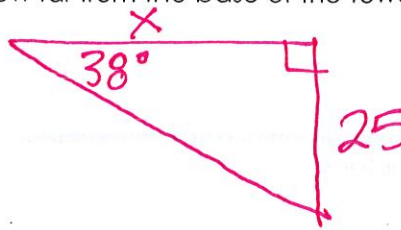


$$50 \tan(71.5) = X$$

$$X = 149.4 + 6 \text{ ft}$$

tree = 155.4 ft

5. The angle of depression from the top of a tower to a boulder on the ground is 38°. If the tower is 25m high, how far from the base of the tower is the boulder?

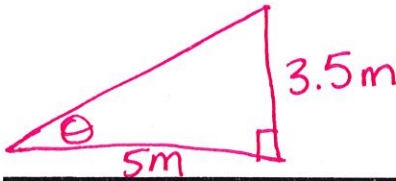


$$\tan 38 = \frac{25}{X}$$

$$X = \frac{25}{\tan 38}$$

$X = 31.99$
 $X = 32 \text{ m}$

6. A rocket is launched at an angle into outer space. After a minute, the rocket traveled 5 miles and had an altitude of 3.5 miles. What is the angle of elevation that the rocket was launched at?

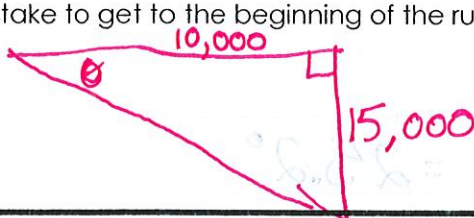


$$\tan(\theta) = \frac{3.5}{5}$$

$$\theta = \tan^{-1}\left(\frac{3.5}{5}\right)$$

$\theta = 35^\circ$

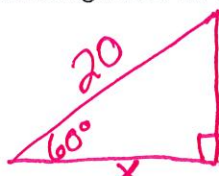
6. The computers on an airplane broke so the pilot has to land the plane by herself. If the planes altitude is 15,000 feet and the plane is 10,000 feet from the beginning of the runway, what angle of depression must she take to get to the beginning of the runway?



$$\theta = \tan^{-1}\left(\frac{15,000}{10,000}\right)$$

$$\theta = 56.3^\circ$$

7. A construction worker leans his ladder against a building making a 60° angles with the ground. If his ladder is 20 feet long, how far away is the base of the ladder from the building?



$$\cos(60) = \frac{X}{20}$$

$$20 \cos(60) = X$$

$$X = 10 \text{ feet}$$