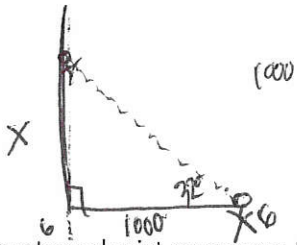
Name: key Hour: _____ **11.3-Applications of Finding Missing Sides ws**

1. You sight a rock climber on a cliff at a 32° angle of elevation. Your eye level is 6 ft above the ground and you are 1000 ft from the base of the cliff. What is the approximate height of the rock climber from the ground?



$1000 \cdot \tan 32 = \frac{X}{1000} \cdot 1000$

$624.9 = X$

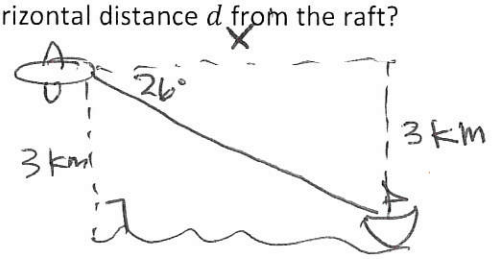
$+6 = \boxed{630.9 \text{ ft}}$

2. A meteorologist measures the angle of elevation of a weather balloon as 41°. A radio signal from the balloon indicates that it is 1503 m from his location. To the nearest meter, how high above the ground is the balloon?

$\sin 41 = \frac{X}{1503}$

$X = \boxed{986.1 \text{ ft}}$

3. An airplane pilot sights a life raft at a 26° angle of depression. The airplane's altitude is 3 km. What is the airplane's horizontal distance d from the raft?



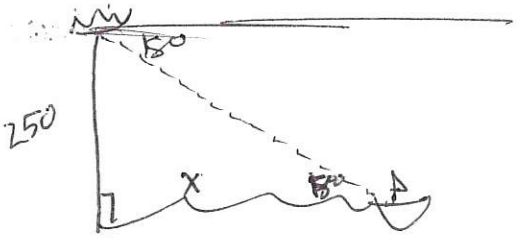
$\tan 26 = \frac{3}{X}$

$X \tan 26 = 3$

$X = \frac{3}{\tan 26}$

$X = \boxed{6.2 \text{ km}}$

4. A tourist looks out from the crown of the Statue of Liberty, approximately 250 ft above the ground. The tourist sees a ship coming into the harbor and measures the angle of depression as 18°. Find the distance from the base of the statue to the ship to the nearest foot.



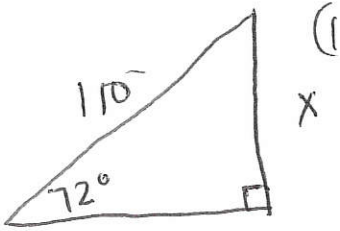
$\tan 18 = \frac{250}{X}$

$X \tan 18 = 250$

$X = \frac{250}{\tan 18}$

$X = \boxed{769 \text{ ft}}$

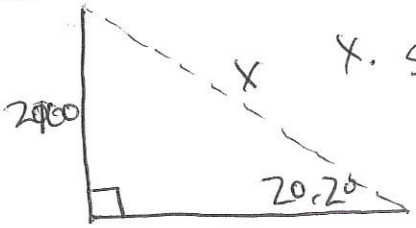
5. A safety regulation states that the maximum angle of elevation for a rescue ladder is 72°. A fire department's longest ladder is 110 feet. What is the maximum safe rescue height?



$(110)\sin 72 = \frac{X}{110} \cdot 110$

$X = \boxed{104.6 \text{ ft}}$

6. The Aerial run in Snowbird, Utah, has an angle of elevation of 20.2°. Its vertical drop is 2900 feet. Estimate the length of this run.



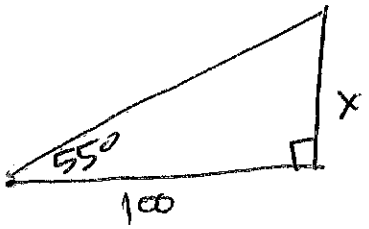
$X \cdot \sin 20.2 = \frac{2900}{X} \cdot X$

$X \sin 20.2 = 2900$

$X = \frac{2900}{\sin 20.2}$

$X = \boxed{8,398.5 \text{ ft}}$

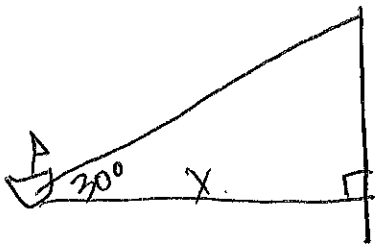
7. A surveyor stands 100 feet from a building and sights the top of the building at a 55° angle of elevation. Find the height of the building.



$\tan 55 = \frac{x}{100}$

$x = 100 \tan 55 = \boxed{142.8 \text{ ft}}$

8. In a sightseeing boat near the base of the Horseshoe Falls at Niagara Falls, a passenger estimates the angle of elevation to the top of the falls to be 30°. If the Horseshoe Falls are 173 feet high, what is the distance from the boat to the base of the falls?

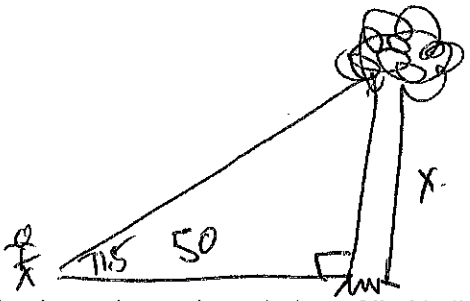


$x \cdot \tan 30 = \frac{173}{x} \cdot x$

$x = \frac{173}{\tan 30}$

$x = \boxed{299.6 \text{ ft}}$

9. A surveyor is standing 50 feet from the base of a large tree. The surveyor measures the angle of elevation to the top of the tree as 71.5°. How tall is the tree?

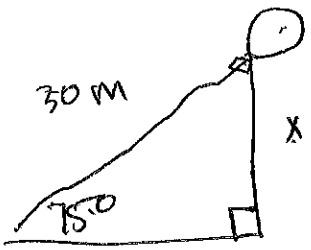


$\tan 71.5 = \frac{x}{50}$

$50 \tan 71.5 = x$

$x = \boxed{149.4 \text{ ft}}$

10. A 30-meter line is used to tether a helium-filled balloon. Because of a breeze, the line makes an angle of approximately 75° with the ground. What is the height of the balloon?



$\sin 75 = \frac{x}{30}$

$30 \sin 75 = x$

$\boxed{x = 29.0 \text{ m}}$