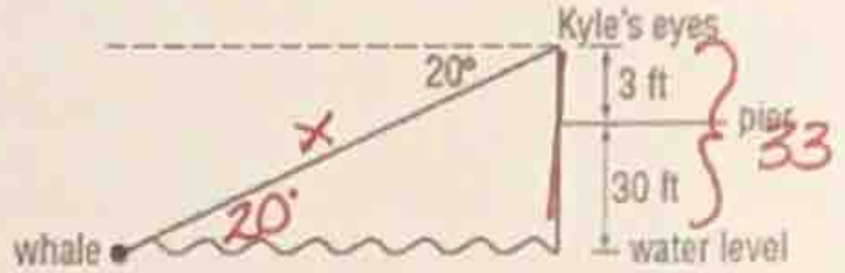
Name: Key Date: _____ Hour: _____

Angle of Elevation and Depression HW#2

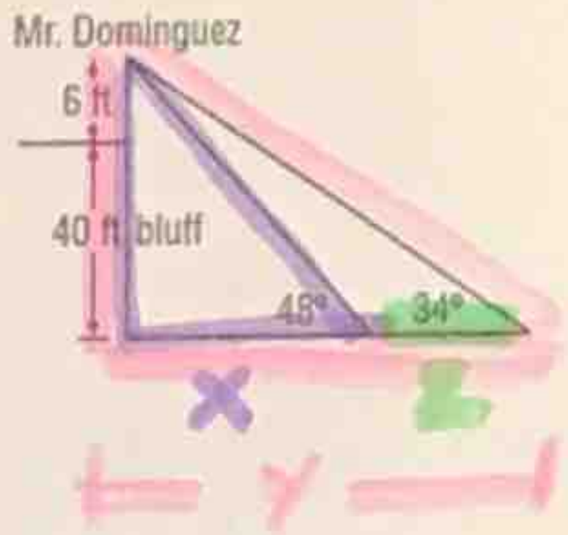
1. **INDIRECT MEASUREMENT** Kyle is at the end of a pier 30 feet above the ocean. His eye level is 3 feet above the pier. He is using binoculars to watch a whale surface. If the angle of depression of the whale is 20°, how far is the whale from Kyle's binoculars? Round to the nearest tenth foot.



$\sin(20) = \frac{33}{x}$

$x \approx 96.49 ft$

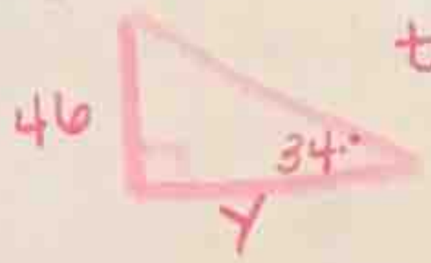
2. **INDIRECT MEASUREMENT** Mr. Dominguez is standing on a 40-foot ocean bluff near his home. He can see his two dogs on the beach below. If his line of sight is 6 feet above the ground and the angles of depression to his dogs are 34° and 48°, how far apart are the dogs to the nearest foot?



46

$\tan(48) = \frac{46}{x}$

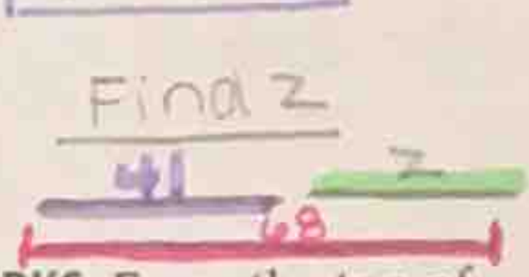
$x = 41 ft$



$\tan(34) = \frac{46}{y}$

$y = 68 ft$

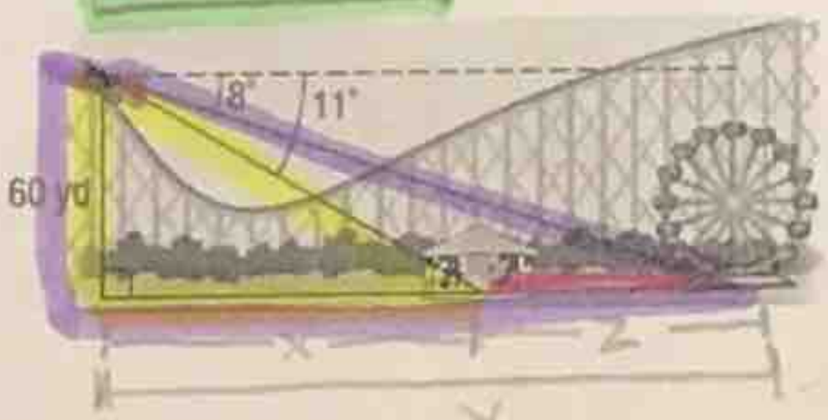
Find z



$41 + z = 68$

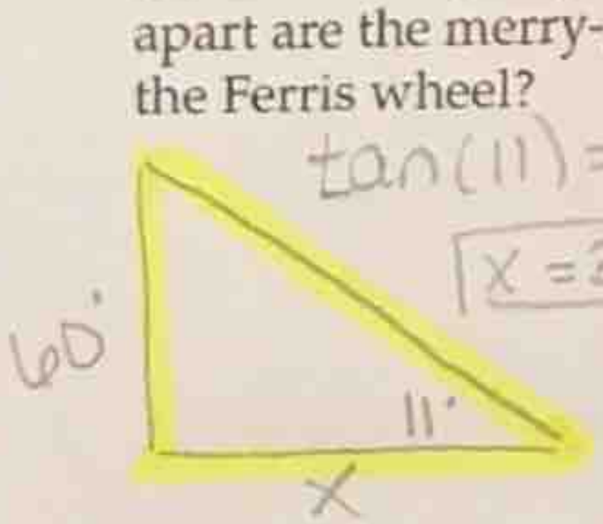
$z = 27 ft$

3. **AMUSEMENT PARKS** From the top of a roller coaster, 60 yards above the ground, a rider looks down and sees the merry-go-round and the Ferris wheel. If the angles of depression are 11° and 8°, respectively, how far apart are the merry-go-round and the Ferris wheel?



$z + 308.67 = 426.92$

$z = 118.25 yd$



$\tan(11) = \frac{60}{x}$

$x = 308.67 yd$

$\tan(8) = \frac{60}{y}$

$y = 426.92 yd$

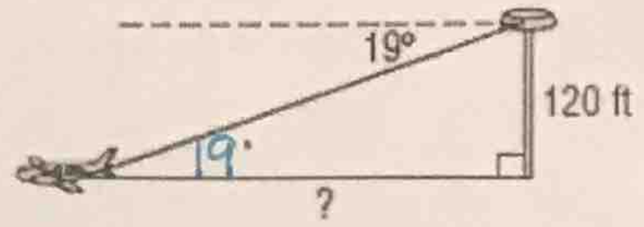
4. A ski run is 1000 yards long with a vertical drop of 208 yards. Find the angle of depression from the top of the ski run to the bottom.

$\sin\theta = \frac{208}{1000}$

$\theta \approx 12°$

$\theta = \sin^{-1}\left(\frac{208}{1000}\right)$

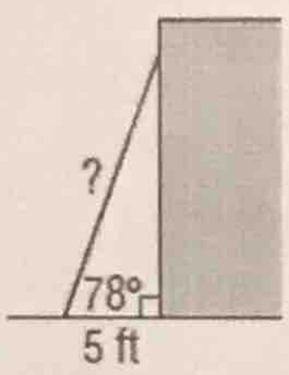
5. From the top of a 120-foot-high tower, an air traffic controller observes an airplane on the runway at an angle of depression of 19°. How far from the base of the tower is the airplane?



$\tan(19) = \frac{120}{x}$

$x = 348.51\text{ ft}$

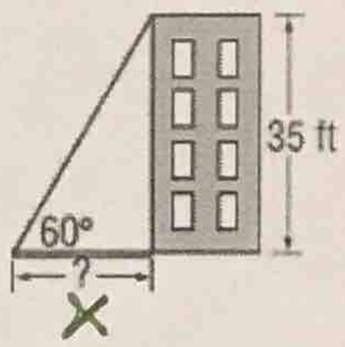
6. A ladder leaning against a building makes an angle of 78° with the ground. The foot of the ladder is 5 feet from the building. How long is the ladder?



$\cos(78^\circ) = \frac{5}{x}$

$x = 24.05\text{ ft}$

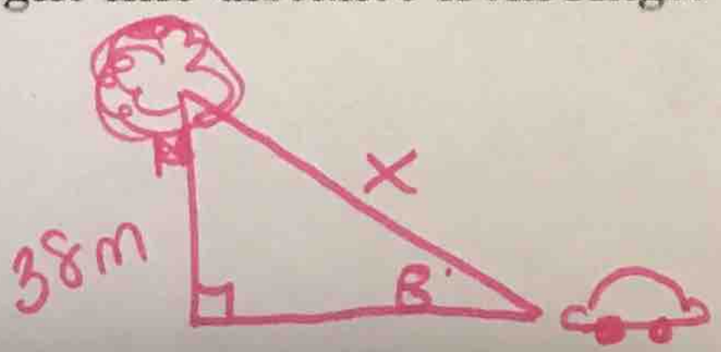
7. **SHADOWS** Suppose the sun casts a shadow off a 35-foot building. If the angle of elevation to the sun is 60°, how long is the shadow to the nearest tenth of a foot?



$\tan(60^\circ) = \frac{35}{x}$

$x = 20.21\text{ ft}$

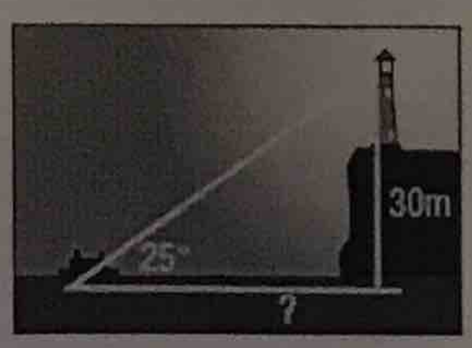
8. **BALLOONING** From her position in a hot-air balloon, Angie can see her car parked in a field. If the angle of depression is 8° and Angie is 38 meters above the ground, what is the straight-line distance from Angie to her car? Round to the nearest whole meter.



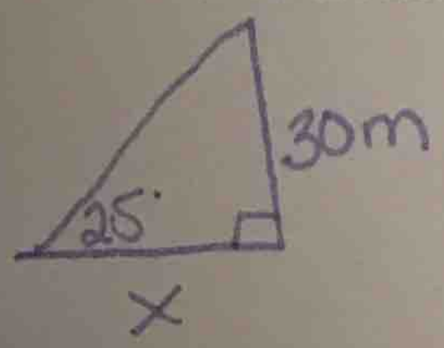
$\sin(8) = \frac{38}{x}$

$x = 273.04\text{m}$

9. **LIGHTHOUSES** Sailors on a ship at sea spot the light from a lighthouse. The angle of elevation to the light is 25°.



The light of the lighthouse is 30 meters above sea level. How far from the shore is the ship? Round your answer to the nearest meter.



$\tan(25^\circ) = \frac{30}{x}$

$x = 64.34\text{m}$