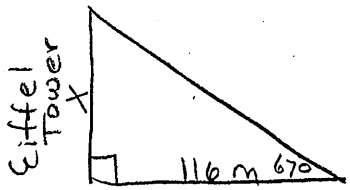
Name Key Date _____ Period _____

CCGPS Analytic Geometry
Right Triangle Trigonometry Word Problems

1. The angle of elevation from a point 116 meters from the base of the Eiffel Tower to the top of the Tower is 67°. Find the approximate height of the tower.



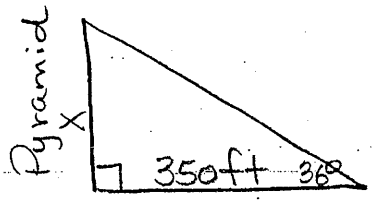
$\tan 67° = \frac{X}{116}$

$116 \tan 67° = x$

$273.279 \approx X$

The height of the Eiffel tower is approximately 273 ft.

2. The angle of elevation to the top of the Egyptian pyramid Cheops is 36°, measured from a point 350 feet from the base of the pyramid. Find the height of Cheops.



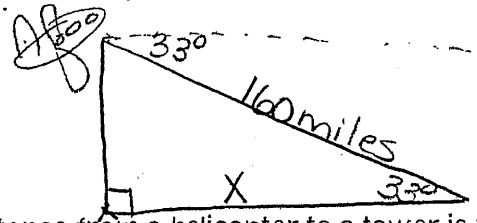
$\tan 36° = \frac{X}{350}$

$350 \tan 36° = x$

$254.29 \approx X$

The height of the pyramid Cheops is approximately 254 ft.

3. DME (Distance Measuring Equipment) is standard avionic equipment on a commercial airplane. This equipment measures the distance from a plane to a radar station. If the distance from a plane to a radar station is 160 miles and the angle of depression is 33°, find the number of ground miles from a point directly below the plane to the radar station.



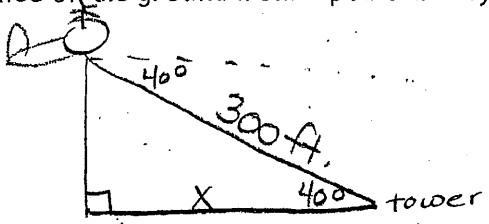
$\cos 33° = \frac{X}{160}$

$160 \cos 33° = X$

$134.187 \approx X$

There are approx. 134 miles from the point directly below the airplan to the radar station

4. If the distance from a helicopter to a tower is 300 feet and the angle of depression is 40°, find the distance on the ground from a point directly below the helicopter to the tower.



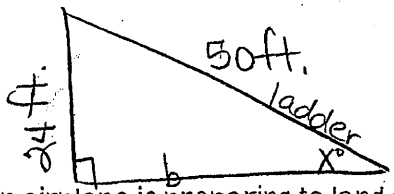
$\cos 40° = \frac{X}{300}$

$300 \cos 40° = X$

$229.813 \approx X$

The distance on the ground from a point below the helicopter to the tower is approx. 230 ft.

5. You are cleaning the gutters on your house. The gutters are at a height of 24 feet. If you have a 50 foot ladder, what is the minimum angle the ladder can form with the ground? How far away from the house is your ladder?



$\sin X° = \frac{24}{50}$

$\sin^{-1}\left(\frac{24}{50}\right) = X°$

$28.685° = X$

$24^2 + b^2 = 50^2$

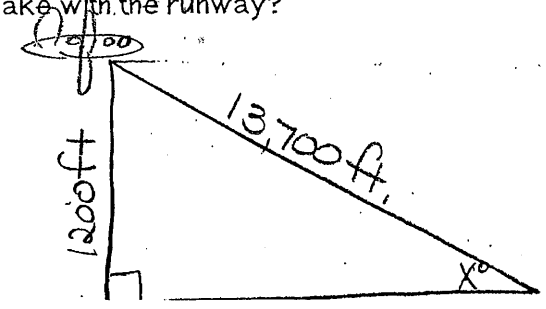
$576 + b^2 = 2500$

$b^2 = 1924$

$b = \sqrt{1924}$

$b \approx 43.863$ ft.

6. An airplane is preparing to land at the airport. The airplane is flying at an altitude of about 1200 feet and is approximately 13,700 feet from the touchdown point on the runway. What angle does the approach path make with the runway?



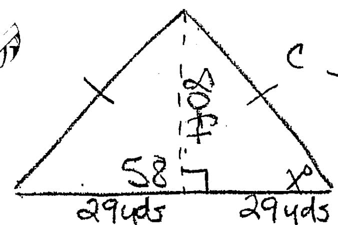
$\sin X° = \frac{1200}{13700}$

$\sin^{-1}\left(\frac{1200}{13700}\right) = X°$

$5.025° \approx X$

80ft ≈ 26.6 yards
29 yds ≈ 87 ft.

7. The base of an isosceles triangle is 58 yards long. The altitude to the base is 80 feet long. What are the measures of the base angles? What are the lengths of the legs?



$\tan x^\circ = \frac{80}{87}$

$\tan^{-1}\left(\frac{80}{87}\right) = x^\circ$

$42.600 \approx x^\circ$

$43^\circ \approx x$

Base ∠s ≈ 43°

$80^2 + 87^2 = c^2$

$13969 = c^2$

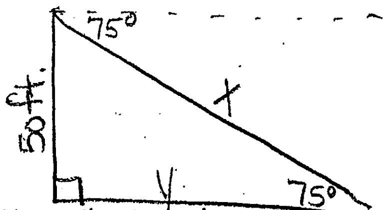
$118.191 \approx c$

$\sin 43^\circ = \frac{80}{c}$

$c = \frac{80}{\sin 43^\circ} \approx 117.3$

29 yds = 87 ft

8. A 50 ft pole has a support wire that runs from its top to the ground with an angle of depression of 75°. How far from the base of the pole does the wire connect to the ground? How long is the wire?



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

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

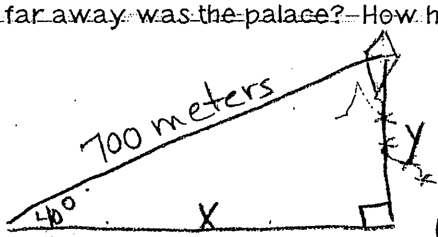
$x \approx 51.764$

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

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

$y \approx 13.397$ ft.

9. According to Chinese legend from the Han Dynasty, General Han Xin flew a kite over the palace. If the general let out 700 meters of string and the kite was flying at a 40° angle of elevation, approximately how far away was the palace? How high was the kite flying?



$\sin 40^\circ = \frac{y}{700}$

$700 \sin 40^\circ = y$

$449.951 = y$

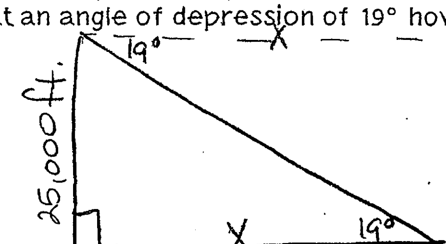
$\cos 40^\circ = \frac{x}{700}$

$700 \cos 40^\circ = x$

$536.231 = x$

Kite is flying 449.951 meters high. The palace is 536.231 meters away.

10. Assume you are flying in a plane at an altitude of 25,000 feet to sky dive. If you can see the landing spot at an angle of depression of 19° how many feet until you are over the landing spot and ready to jump?

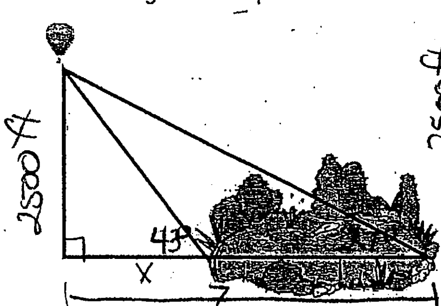


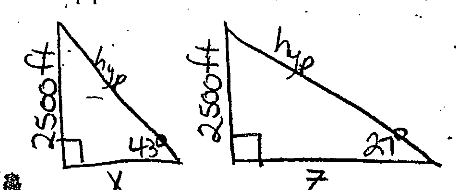
$\tan 19^\circ = \frac{25000}{x}$

$x = \frac{25000}{\tan 19^\circ}$

$x \approx 72605.272$ ft until over landing spot.

11. The angle of depression of one side of a lake, measured from a balloon 2500 feet above the lake is 43°. The angle of depression to the opposite side of the lake is 27°. Find the width of the lake.





z − x = width of lake

$\tan 43^\circ = \frac{2500}{x}$

$x = \frac{2500}{\tan 43^\circ}$

$\tan 27^\circ = \frac{2500}{z}$

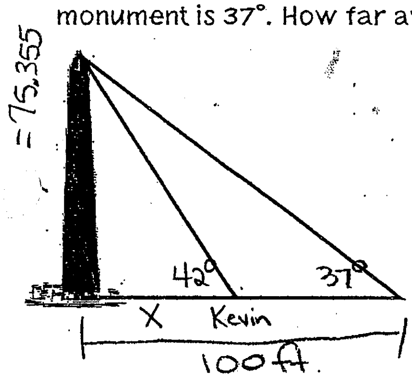
$z = \frac{2500}{\tan 27^\circ}$

$x \approx 2680.922$ ft. $z \approx 4906.526$ ft.

$4906.526 - 2680.922 \approx 2226$ ft

The width lake is approx. 2226 ft.

12. Kevin is standing x feet from the base of the Washington Monument and the angle of elevation to the top of the monument is 42°. Mark is standing 100 feet away and the angle of elevation to the top of the monument is 37°. How far away is Kevin standing?



$\tan 37^\circ = \frac{y}{100}$

$100 \tan 37^\circ = y$

$75.355 \approx y$

$\tan 42^\circ = \frac{75.355}{x}$

$x = \frac{75.355}{\tan 42^\circ}$

$83.691 \approx x$

Kevin is standing approximately 84 ft. away from the base of the monument.