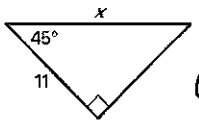
Advanced Algebra
Finding Angles and Trigonometry Word Problems

#1

Name_____

_____**1.** Which ratio should be used to find *x*?

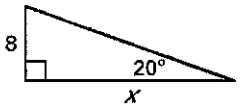
a. tangent
b. cosine
c. sine
d. Pythagorean



$\cos 45 = \frac{11}{x}$

_____**2.** Which ratio should be used to find *x*?

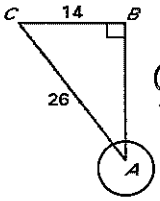
a. tangent
b. cosine
c. sine
d. Pythagorean



$\tan 20 = \frac{8}{x}$

_____**3.** What ratio should be used to find the measure of angle A?

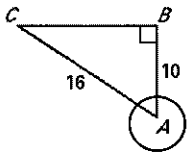
a. tangent
b. cosine
c. sine
d. Pythagorean



$\sin^{-1}\left(\frac{14}{26}\right)$

_____**4.** What ratio should be used to find the measure of angle A?

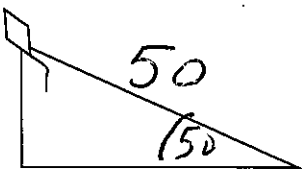
a. tangent
b. cosine
c. sine
d. Pythagorean



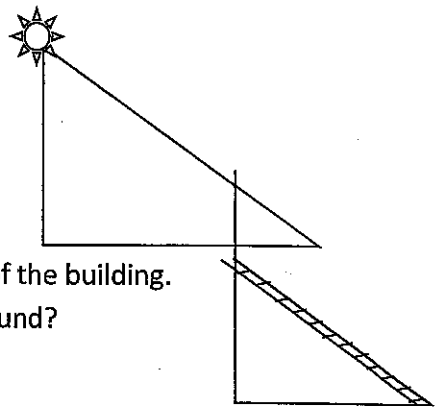
$\cos^{-1}\left(\frac{10}{16}\right)$

Use the triangle at the right to help you solve the following problems. Label the information given and the use SOH CAH TOA or Pythagorean Theorem to find the answers.

383 _____**5.** Mary is flying a kite on a 50-meter string. The string is making a 50° angle with the ground. How high above the ground is the kite?



$\sin 50 = \frac{y}{50}$



_____**6.** At a certain time of day, the angle of elevation of the sun is 44°. Find the length of the shadow cast by a building 30 meters high.

_____**7.** A 20-foot ladder leans against a wall so that the base of the ladder is 8 feet from the base of the building. What angle does the ladder make with the ground?

(6) $\tan 44 = \frac{30}{x}$

$x = 31.1$

(7) $\cos^{-1}\left(\frac{8}{20}\right)$

$\theta = 66.4°$

Find the measure of angle C to the nearest degree. SHOW WORK.

_____**8.**

$\sin^{-1}\left(\frac{10}{16}\right)$

$\theta = 38.7$

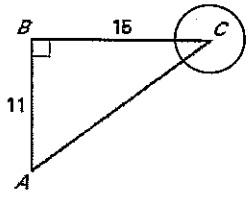
_____**10.**

$\cos^{-1}\left(\frac{14}{26}\right)$

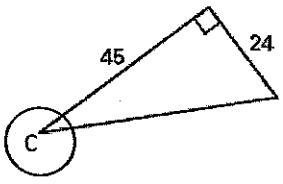
$\theta = 57.4$

36.2 **9.**

28.1° **11.**



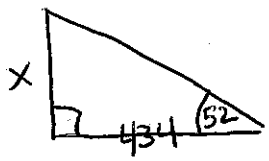
$\tan^{-1}\left(\frac{11}{15}\right)$



$\tan^{-1}\left(\frac{24}{45}\right)$

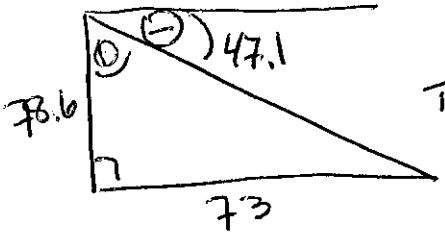
Draw a figure when necessary, then solve. You should round measures of segments to the nearest tenth, and round measures of angles to the nearest degree.

12. The Washington monument cast a shadow 434 ft. long when the angle of elevation to the sun is 52°. Find the height of the monument.



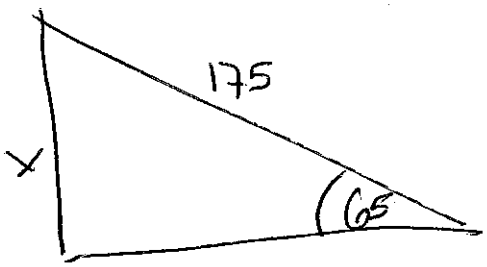
$\tan 52 = \frac{x}{434}$

13. While standing on a cliff, Gilligan sights a sailboat 73 m out in the water (horizontal distance). The cliff is 78.6 m high. Find the angle of depression from Gilligan to the sailboat.



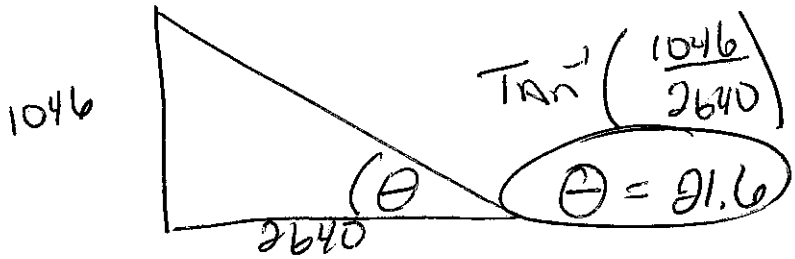
$\tan\phi = \frac{73}{78.6}$ $\quad \phi = 42.9$ $\quad \theta = 90 - 42.9$ $\quad \theta = 47.1$

14. The length of a cable (guy wire) supporting a radio tower is 175 ft. The angle of elevation of the top of the radio tower from the foot of the guy wire is 65°. How tall is the tower?



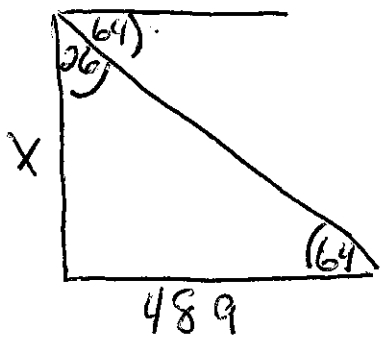
$\sin 65 = \frac{x}{175}$ $\quad x = 158.6$

15. The Chrysler Building in New York is 1046 ft. tall. A person stands a half a mile away and views the top of the building. Find the angle of elevation to the top of the Chrysler Building.
(NOTE: There are 5280 feet in 1 mile.)



$\tan^{-1}\left(\frac{1046}{2640}\right)$ $\quad \theta = 21.6$

16. Pierre is on top of the Eiffel Tower and looking at a bench in the park below. The angle of depression is 64° if the bench is 489 ft from the foot of the tower, how tall is the Eiffel Tower?



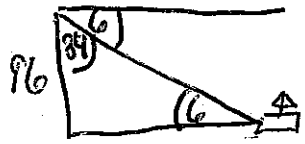
1002.6

$\tan 64 = \frac{x}{489}$

$x = 1002.6$

$D = rt$

17. A person on a bridge sights a boat at an angle of depression of 6°. The bridge is 96 ft above the water. If the boat is traveling 40ft/min, about how long will it take the boat to reach the bridge?



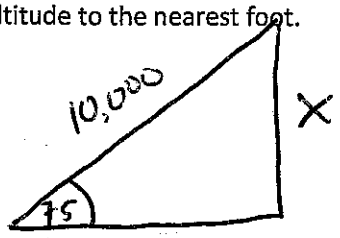
$\tan 84 = \frac{x}{96}$

$x = 913.4$

$913 = 40t$

$t = 22.8$ min

18. A rocket is fired at sea level and climbs at a constant angle of 75° through a distance of 10,000 feet. Approximate its altitude to the nearest foot.



$\sin 75 = \frac{x}{10,000}$

$x = 9,659.26$ feet

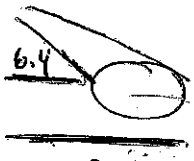
19. A surveyor is 100 meters from a bridge. The angle of elevation to the top of the bridge is 35. The surveyor's instrument is 1.45 meters above the ground. Find the height of the bridge.

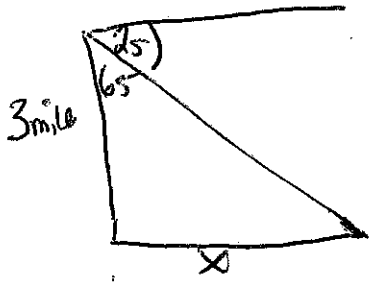
20. Before Apollo 11 descended to the surface of the moon, it made one orbit at a distance of 3 miles from the surface. At one point in its orbit, the onboard guidance system measured the angles of depression to the near and far edges of the huge crater .The angle measured 25° and 18 °. Find the distance across the crater.

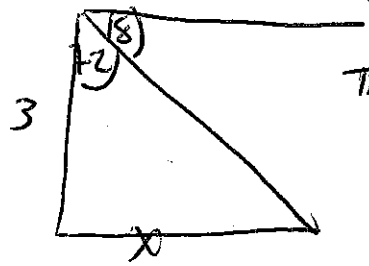
2.77

$\tan 65 = \frac{x}{3}$

$x = 6.43$





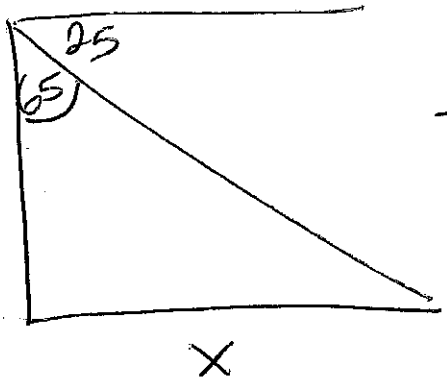


$\tan 72 = \frac{x}{3}$

$x = 9.2$

21. A lighthouse built at sea level is 150 feet high. From its top, the angle of depression of a buoy is 25 °. Find, to the nearest foot, the distance from the buoy to the foot of lighthouse.

$90 - 25$



$\tan 65 = \frac{x}{150}$

$x = 321.7$

22. In a parking garage, each level is 20 feet apart. The ramp to each level is 130 feet long. Find the measure of the angle of elevation for each ramp.