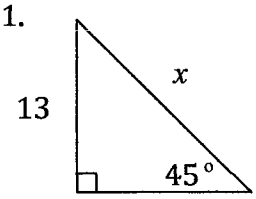
Name_____ Date_____ Period_____

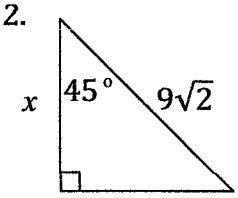
In questions 1-9 , use **special right triangles** to find the value of x and y. ***Show your work.***

1.



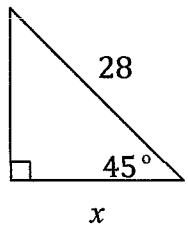
$x =$ $13\sqrt{2}$

2.



$x =$ 9

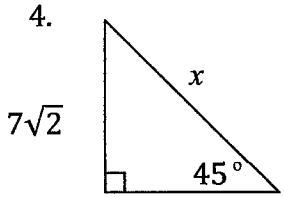
3.



$\frac{28}{\sqrt{2}} \frac{\sqrt{2}}{\sqrt{2}} =$

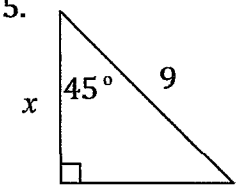
$x =$ $14\sqrt{2}$

4.



$x =$ 14

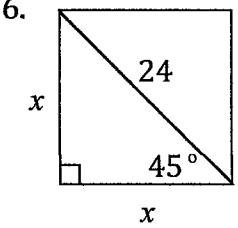
5.



$\frac{9}{\sqrt{2}}$

$x =$ $\frac{9\sqrt{2}}{2}$

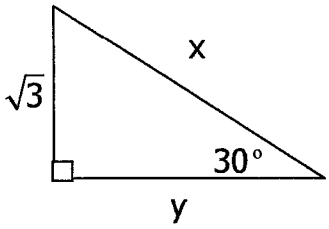
6.



$\frac{24}{\sqrt{2}}$

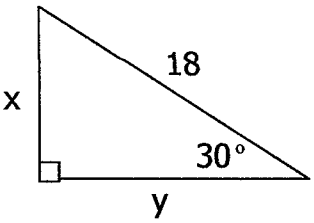
$x =$ $12\sqrt{2}$

7.



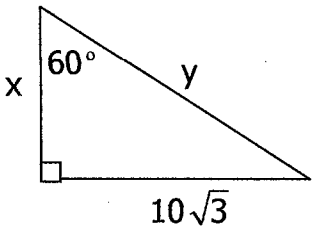
x = $2\sqrt{3}$ y = 3

8.



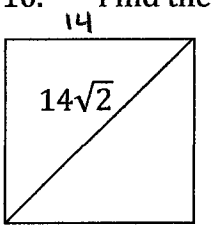
x = 9 y = $9\sqrt{3}$

9.



x = 10 y = 20

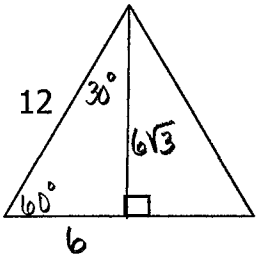
10. Find the perimeter of the square with the given diagonal.



P= (4)(14)

P = 56 units

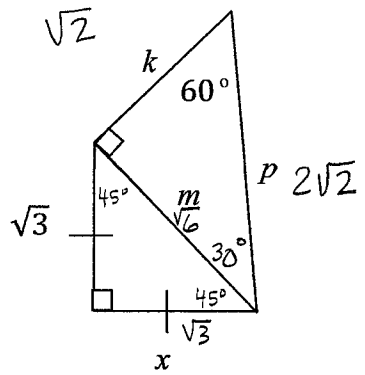
11. Find the altitude of this equilateral triangle.



$6\sqrt{3}$

12. Find the missing lengths

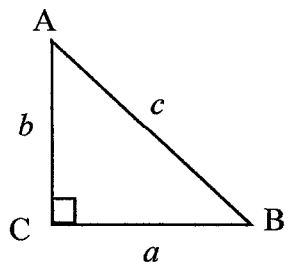
$x = \sqrt{3}$
$m = \sqrt{6}$
$k = \sqrt{2}$
$p = 2\sqrt{2}$



$\frac{\sqrt{6}}{\sqrt{3}} = \sqrt{2}$

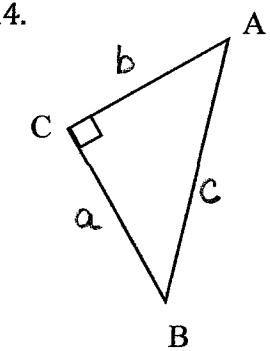
Use the definitions of the six trig ratios to complete each statement.

13.



sinA= a/c
cosA= b/c
tanA= a/b
cscA= c/a
secA= c/b
cotA= b/a

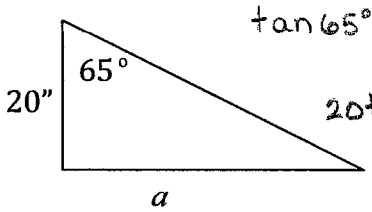
14.



sinB= b/c
cosB= a/c
tanB= b/c
cscB= c/b
secB= c/a
cotB= c/b

Use trig ratios to approximate each length to the nearest tenth (these are all RIGHT triangles).

15.

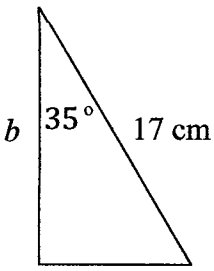


$\tan 65° = \frac{a}{20}$

$20 \tan 65° = a$

$a = 42.9$ in

16.

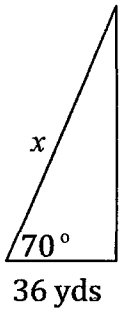


$\cos 35° = \frac{b}{17}$

$17 \cos 35° = b$

$b = 13.9$ cm

17.

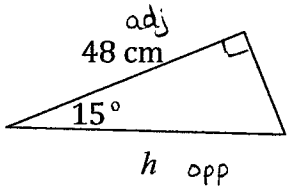


$\cos 70° = \frac{36}{x}$

$x = \frac{36}{\cos 70°}$

$x = 105.3$ yds

18.

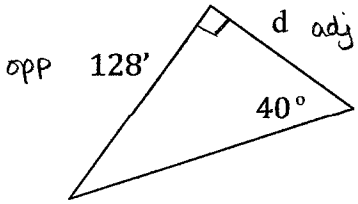


$\cos 15° = \frac{48}{h}$

$h = \frac{48}{\cos 15°}$

$h = 49.7$ cm

19.

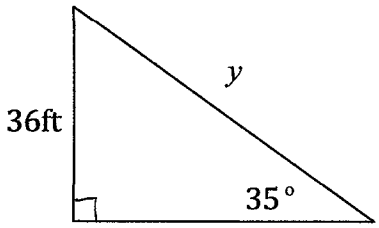


$\tan 40° = \frac{128}{d}$

$d = \frac{128}{\tan 40°}$

$d = 152.5$ ft

20.



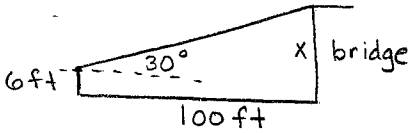
$\sin 35° = \frac{36}{y}$

$y = \frac{36}{\sin 35°}$

$y = 62.8$ ft

For each problem, draw a picture/diagram showing the right triangle. Then write a trig ratio equation, and solve the equation to answer the problem.

21. How tall is a bridge if a 6-foot tall person standing 100 feet away can see the top of the bridge at an angle of 30 degrees to the horizon?



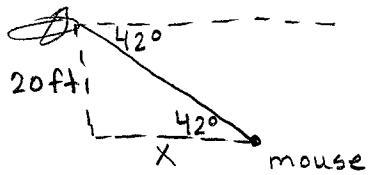
$\tan 30° = \frac{x}{100}$

$100 \tan 30° = x$

$x = 57.74$ ft $+6$ ft person

63.7 ft

22. An eagle spotted a mouse 20 feet below at an angle of 42 degrees with the horizon. If the eagle flies along its line of sight, how far will it have to fly to reach its prey?

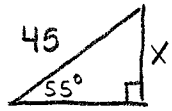


$\tan 42° = \frac{20}{x}$

$x = \frac{20}{\tan 42°}$

$x = 22.2$ ft

23. A 45-foot ladder makes an angle of measure 55 degrees with the ground. How high up the wall does the ladder reach?



$\sin 55° = \frac{x}{45}$

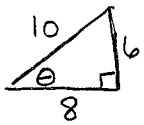
$45 \sin 55° = x$

$x = 36.9$ ft

24. If the sine of an angle is 4/7, what is the cosine of its complement?

$\cos(\pi/2 - \theta) = \frac{4}{7}$

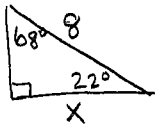
25. Find the sine of the smaller acute angle of a right triangle with side lengths of 6, 8, and 10.



$\sin\theta = \frac{6}{10}$

$\sin\theta = \frac{3}{5}$

26. Find, to the nearest unit, the length of the longer leg of a right triangle if the length of the hypotenuse is 8, and the measure of an acute angle is 22°.



$\sin 68° = \frac{x}{8}$

$8 \sin 68° = x$

$x = 7.4$

Convert to the opposite units.

27. $42° \left(\pi/180°\right)$

$\frac{7\pi}{30}$

28. $-\frac{\pi}{9}\left(\frac{180°}{\pi}\right)$

$-20°$

29. $-4\left(\frac{180°}{\pi}\right) = -229.2°$

Find one positive and one negative angle that are coterminal with an angle having the following measures.

30. $\frac{\pi}{6}$

$\frac{\pi}{6} + 2\pi = \frac{13\pi}{6}$

$\frac{\pi}{6} - 2\pi = \frac{-11\pi}{6}$

31. 145°

$145° + 360° = 505°$

$145° - 360° = -215°$

32. $-\frac{2\pi}{15}$

$-\frac{2\pi}{15} + 2\pi = \frac{28\pi}{15}$

$-\frac{2\pi}{15} - 2\pi = \frac{-32\pi}{15}$

If possible find the complement and supplement of the angle.

33. $\frac{\pi}{4}$

complement $\frac{\pi}{2} - \frac{\pi}{4} = \frac{\pi}{4}$

supplement $\pi - \frac{\pi}{4} = \frac{3\pi}{4}$

34. 100°

complement → None

supplement $180° - 100° = 80°$

35. Find the arc length and the area of the sector. θ = 60°, r = 3in.

$S = r\theta$ $\theta = 60° = \frac{\pi}{3}$

$S = 3(\pi/3) = \pi$

$S = 3.14$ in

Use a calculator to find each value: (round to 3 decimal places if necessary)

36. $\sin 81° = .988$

37. $\tan(-135°) = 1$

38. $\cos \frac{4\pi}{9} = .174$

39. $\sec(-270°) =$ undefined

40. $\cot \frac{3\pi}{4} = -1$

41. $\cot 90° = 0$

Find the exact value of each trigonometric function. (NO Calculator!)

42. $\cos 240° = \frac{-1}{2}$

43. $\csc 330° = -2$

44. $\sec(-2\pi) = 1$

45. $\sin \frac{10\pi}{3} = -\frac{\sqrt{3}}{2}$

46. $\tan \frac{7\pi}{4} = -1$

47. $\cot\left(-\frac{\pi}{2}\right) = 0$

Solve for θ given the trig function and its value. (NO Calculator); $0° \le \theta \le 360°$

48. $\sin\theta = \frac{1}{2}$

$\theta = 30°, 150°$

49. $\tan\theta = -\frac{\sqrt{3}}{3}$

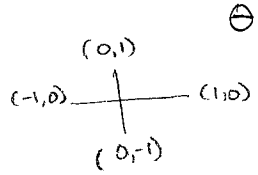
$\theta = 150°, 330°$

50. $\cos\theta = -\frac{\sqrt{2}}{2}$

$\theta = 135°, 225°$

51. $\cot\theta = undefined$

$\theta = 180°, 360°$



52. $\sec\theta = \frac{2\sqrt{3}}{3}$

$\cos\theta = \sqrt{3}/2$

$\theta = 30°, 330°$

53. $\csc\theta = -2$

$\sin\theta = -\frac{1}{2}$

$\theta = 210°, 330°$