Honors Pre-Calculus

Name **Key** ⊥

Trigonometry Test 1 Review

Date_____ Period_____

Find a positive and a negative coterminal angle for each given angle.

1) 705°

$$345°, \; -15°$$

2) −230°

$$130°, \; -590°$$

3) $\dfrac{49\pi}{45}$

$$\dfrac{139\pi}{45}, \; \dfrac{-41\pi}{45}$$

4) $-\dfrac{\pi}{2}$

$$\dfrac{3\pi}{2}, \; \dfrac{-5\pi}{2}$$

Find a coterminal angle between 0 and 2π for each given angle.

5) $\dfrac{35\pi}{12}$

$$\dfrac{11\pi}{12}$$

6) $\dfrac{37\pi}{12}$

$$\dfrac{13\pi}{12}$$

Convert each degree measure into radians and each radian measure into degrees.

7) 45°

$$\dfrac{\pi}{4}$$

8) $-\dfrac{41\pi}{36}$

$$-205°$$

Find the length of each arc. $(L = r\theta)$

9) $r = 17$ yd, $\theta = \dfrac{\pi}{3}$

$$\dfrac{17\pi}{3} \text{ yd}$$

10) $r = 18$ in, $\theta = \dfrac{3\pi}{2}$

$$27\pi \text{ in}$$

11) $r = 13$ mi, $\theta = 240°$

$$\dfrac{312\pi}{9} \text{ mi}$$

12) $r = 16$ cm, $\theta = 315°$

$$\dfrac{504\pi}{9} \text{ cm}$$

Find the exact value of each trigonometric function.

13) $\sec 30°$

$$\dfrac{2\sqrt{3}}{3}$$

14) $\csc -330°$

$$2$$

15) $\sin -\dfrac{3\pi}{4}$

$$-\dfrac{\sqrt{2}}{2}$$

16) $\sin \dfrac{5\pi}{6}$

$$\dfrac{1}{2}$$

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17) $\cos 0$ $\boxed{1}$

18) $\tan -\dfrac{25\pi}{6}$ $\boxed{-\dfrac{\sqrt{3}}{3}}$

19) $\cot -780°$ $\boxed{-\dfrac{\sqrt{3}}{3}}$

20) $\cot 0$ $\boxed{\text{Undefined}}$
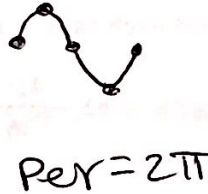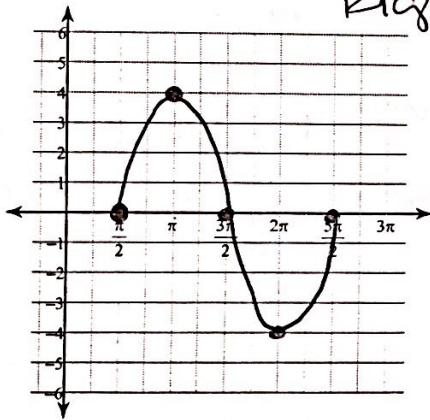
21) $\csc -\dfrac{7\pi}{2}$ $\boxed{1}$

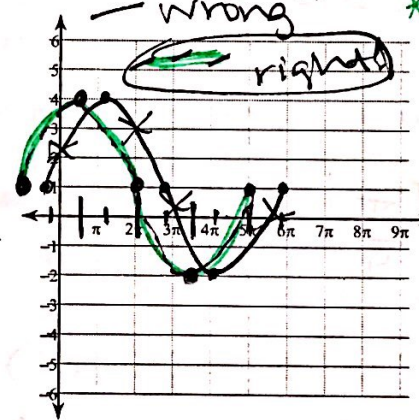22) $\cos -\dfrac{17\pi}{3}$ $\boxed{\dfrac{1}{2}}$

Graph each function using radians. State the Amplitude, Period, Phase Shift, and Vertical Shift.

one period

23) $y = 4\sin\left(\theta - \dfrac{\pi}{2}\right)$
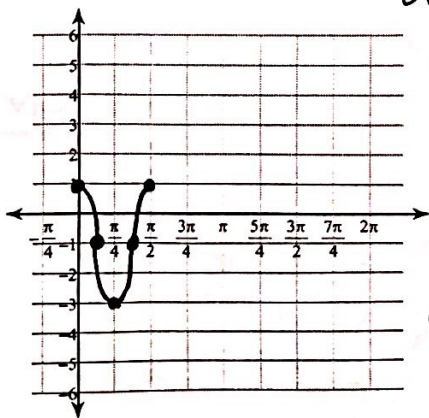
amp = 4
Right $\dfrac{\pi}{2}$
Per = 2TT

24) $y = 1 + 3\sin\left(\dfrac{\theta}{3} + \dfrac{\pi}{3}\right)$

amp = 3
up 1
wrong — right
*Left TT
Per = $\dfrac{2\pi}{1/3}$ = 6TT
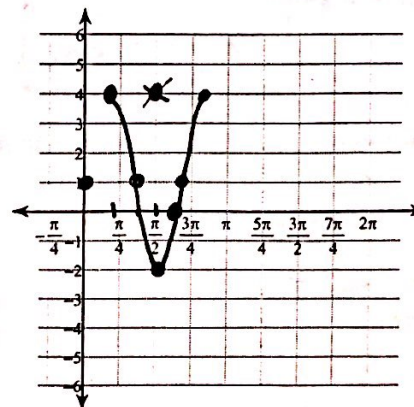count by
$\dfrac{6\pi}{4} = \dfrac{3\pi}{2}$

25) $y = -1 + 2\cos 4\theta$

amp = 2
down 1
Per = $\dfrac{2\pi}{4}$
= $\dfrac{\pi}{2}$
count by:
$\dfrac{\pi}{2} \div 4 = \dfrac{\pi}{8}$

26) $y = 3\cos\left(3\theta - \dfrac{\pi}{2}\right) + 1$

*Right $\dfrac{\pi}{6}$
amp = 3
up 1
~~Right $\dfrac{\pi}{2}$~~
Per = $\dfrac{2\pi}{3}$
count by:
$\dfrac{2\pi}{3} \div 4$
= $\dfrac{\pi}{6}$

For the following questions determine the quadrant of θ if the angle is in standard position with $0 \le \theta \le 2\pi$

27. $\underline{\sin \theta < 0}$ and $\underline{\tan \theta > 0}$

    III IV   I III $\boxed{III}$

28. $\underline{\tan \theta < 0}$ and $\underline{\sin \theta > 0}$

    II IV   I II $\boxed{II}$

29. $\underline{\cos \theta < 0}$ and $\underline{\csc \theta > 0}$

    II III   I II $\boxed{II}$

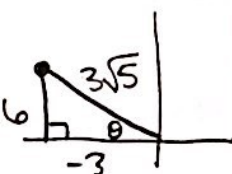30. $\underline{\sec \theta < 0}$ and $\underline{\csc \theta > 0}$

    II III   I II $\boxed{II}$

For the following questions point P is on the terminal side of angle θ. Evaluate the six trig functions for θ.

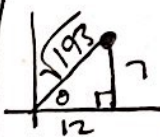31. (-3, 6)

$\sin\theta = \dfrac{2\sqrt{5}}{5} \qquad \cos\theta = \dfrac{-\sqrt{5}}{5} \qquad \tan\theta = -2$

$\csc\theta = \dfrac{\sqrt{5}}{2} \qquad \sec\theta = -\sqrt{5} \qquad \cot\theta = \dfrac{-1}{2}$
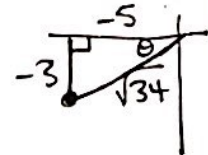
32. (12, 7)

$\sin\theta = \dfrac{7\sqrt{193}}{193} \qquad \csc\theta = \dfrac{\sqrt{193}}{7}$

$\cos\theta = \dfrac{12\sqrt{193}}{193} \qquad \sec\theta = \dfrac{\sqrt{193}}{12}$

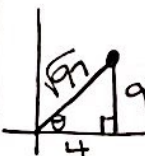$\tan\theta = \dfrac{7}{12} \qquad \cot\theta = \dfrac{12}{7}$

33. (-5, -3)

$\sin\theta = \dfrac{-3\sqrt{34}}{34} \qquad \cos\theta = \dfrac{-5\sqrt{34}}{34} \qquad \tan\theta = \dfrac{3}{5}$

$\csc\theta = \dfrac{-\sqrt{34}}{3} \qquad \sec\theta = \dfrac{-\sqrt{34}}{5} \qquad \cot\theta = \dfrac{5}{3}$
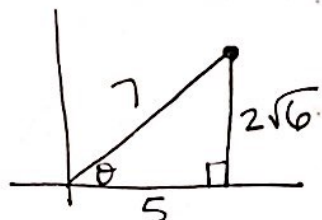
34. (4, 9)

$\sin\theta = \dfrac{9\sqrt{97}}{97} \qquad \csc\theta = \dfrac{\sqrt{97}}{9}$

$\cos\theta = \dfrac{4\sqrt{97}}{97} \qquad \sec\theta = \dfrac{\sqrt{97}}{4}$

$\tan\theta = \dfrac{9}{4} \qquad \cot\theta = \dfrac{4}{9}$

35. Use a right triangle to determine the values of all trigonometric functions of θ, where $\cos \theta = 5/7$
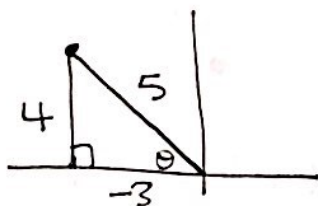
$\sin\theta = \boxed{\dfrac{2\sqrt{6}}{7}} \qquad \csc\theta = \boxed{\dfrac{7\sqrt{6}}{12}} \qquad \sec\theta = \boxed{\dfrac{7}{5}}$

$\tan\theta = \boxed{\dfrac{2\sqrt{6}}{5}} \qquad \cot\theta = \boxed{\dfrac{5\sqrt{6}}{12}}$

36. Find $\csc \theta$ and $\cot \theta$ if $\tan \theta = -4/3$ and $\sin \theta > 0$
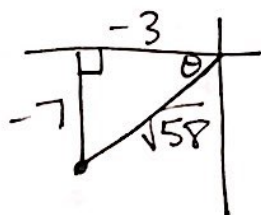
    Ⓘ IV   I Ⓘ

$\csc\theta = \dfrac{H}{O} = \boxed{\dfrac{5}{4}} \qquad \cot\theta = \dfrac{A}{O} = \boxed{\dfrac{-3}{4}}$

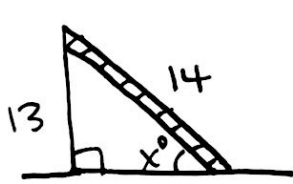37. Find $\sin \theta$ and $\cos \theta$ if $\cot \theta = 3/7$ and $\sec \theta < 0$

    I Ⓘ   II Ⓘ

$\sin\theta = \dfrac{O}{H} = \boxed{\dfrac{-7\sqrt{58}}{58}} \qquad \cos\theta = \boxed{\dfrac{-3\sqrt{58}}{58}}$

38. A 14 foot ladder is used to scale a 13 foot wall. At what angle of elevation must the ladder be situated in order to reach the top of the wall?
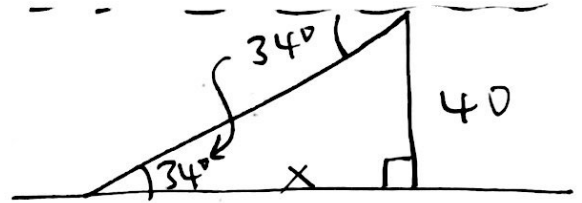
$$\sin x = \frac{13}{14}$$

radian mode

$$x \approx \boxed{1.19} \quad \text{degree mode!}$$

$$\approx \boxed{68.2°} \quad \leftarrow \text{degree mode!}$$

39. From the top of a vertical cliff 40m high, the angle of depression of an object that is level with the cliff is 34°. How far is the object from the base of the cliff?

$$\tan(34) = \frac{40}{x}$$

$$x \approx \boxed{59.3 \, m}$$

40. A man flies a kite with a 100 foot string. The angle of elevation of the string is 52°. How high off the ground is the kite?
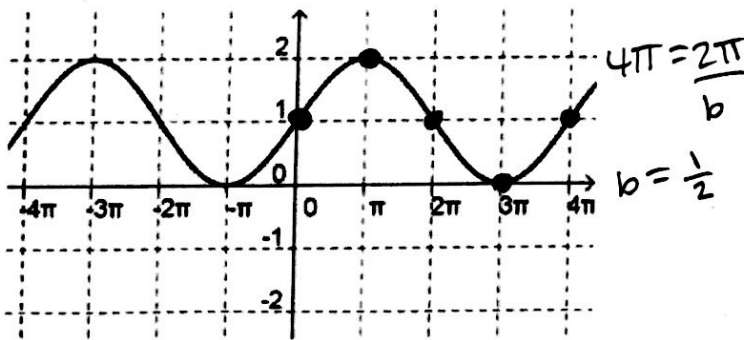
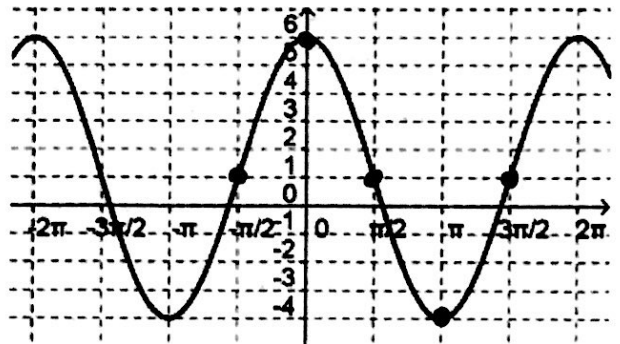$$\sin(52) = \frac{x}{100}$$

$$x \approx \boxed{78.8 \, ft}$$

For the following questions write the equation for the pictured graphs.

Use sine for graphs 41 and 42 and cosine for graphs 43 and 44.

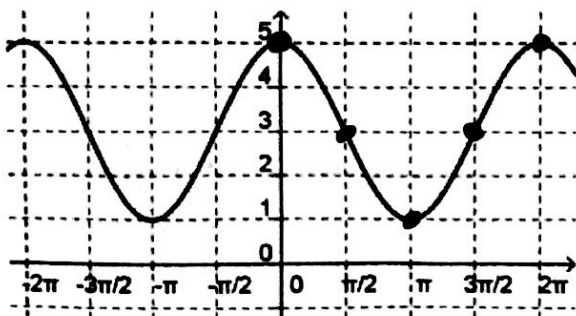**41.** $\boxed{y = \sin\left(\frac{\theta}{2}\right) + 1}$

$$4\pi = \frac{2\pi}{b}$$

$$b = \frac{1}{2}$$

42. $\boxed{y = 5\sin\left(x + \frac{\pi}{2}\right) + 1}$

43. $\boxed{y = 2\cos x + 3}$

44. $\boxed{y = \frac{-1}{2}\cos\left(x + \frac{\pi}{2}\right) - 1}$