

## Worksheet - Trigonometry

1. Convert  $30^\circ$  to radians.
2. Convert  $\frac{\pi}{2}$  radians to degrees.
3. Which of the following angles correspond to the same spot on the unit circle?  $\frac{\pi}{4}$ ,  $\frac{5\pi}{4}$ ,  $\frac{9\pi}{4}$ ,  $\frac{-7\pi}{4}$
4. What is an angle in the range  $[\pi, 2\pi]$  that corresponds to the angle  $-\frac{\pi}{6}$  (i.e., is coterminal with  $-\frac{\pi}{6}$ )?
5. What is an angle in the range  $[-\pi, 0]$  that corresponds to the angle  $\frac{5\pi}{3}$  (i.e., is coterminal with  $\frac{5\pi}{3}$ )?
6. Draw the unit circle. Label the angles  $0, \frac{\pi}{6}, \frac{\pi}{3}, \frac{3\pi}{4}, \pi, \frac{7\pi}{6}, \frac{7\pi}{4}, 2\pi, -\frac{\pi}{4}, -\frac{5\pi}{3}$ . Label the coordinates of the points on the unit circle that correspond to those angles.

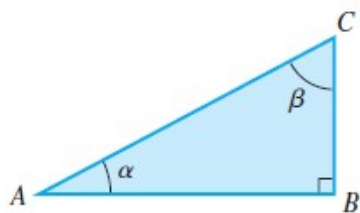
7. Find an angle in  $[0, 2\pi)$  that is "coterminal" with the angle  $\frac{65\pi}{6}$ .
8. Find an angle in  $[0, 2\pi)$  that is "coterminal" with the angle  $\frac{14\pi}{5}$ .
9. Find the "reference angle" for the angle  $\frac{7\pi}{4}$ . (The reference angle is the angle in  $[0, \frac{\pi}{2}]$  formed between a given angle and the  $x$ -axis, so for example, the reference angle for  $\frac{2\pi}{3}$  is  $\frac{\pi}{3}$ .)
10. Find the "reference angle" for the angle  $\frac{5\pi}{6}$ .
11. Find the "reference angle" for the angle  $\frac{17\pi}{5}$ .
12. What is  $\sin(30^\circ)$ ?
13. What is  $\csc\left(\frac{5\pi}{6}\right)$ ?
14. If  $t = \frac{20\pi}{3}$ , what are  $\sin(t)$ ,  $\csc(t)$ , and  $\cot(t)$ ?
15. If  $\cot(t) = 1$  and  $t$  is in the interval  $[\pi, 2\pi]$ , then what is  $\sin(t)$ ?

16. If  $\cos(t) = \frac{-1}{2}$  and  $t$  is in the interval  $[\pi, 2\pi]$ , then what is  $\tan(t)$ ?

17. Given that  $\cos(\theta) = \frac{2}{7}$  and  $\theta$  is in quadrant IV, find  $\sin(\theta)$ .

18. Given that  $\tan(\theta) = \frac{-3}{5}$  and  $\theta$  is in quadrant II, find  $\csc(\theta)$ .

19. Use the triangle below to answer these questions.



(a) Say  $\alpha = \frac{\pi}{4}$  and  $BC = 8$ . What is  $AB$ ?

(b) Say  $\beta = \frac{\pi}{6}$  and  $BC = 20$ . What is  $AC$ ?

(c) Say  $AB = 5$  and  $BC = 10$ . What is  $\alpha$ ?

20. If  $\sin(t) = \frac{\sqrt{2}}{2}$ , what might  $t$  be? Give all possible solutions in  $[-\pi, \pi]$

21. If  $\sin t = 1$ , what might  $t$  be? Give all possible solutions in  $[0, 2\pi]$ .

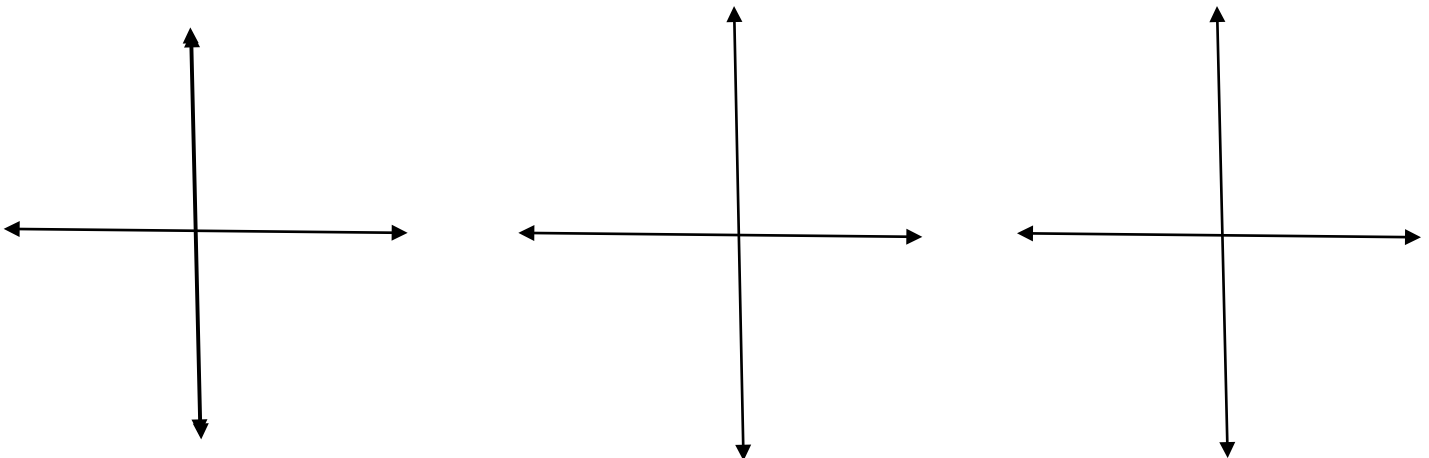
22. If  $\cos(t) = .5$ , what might  $t$  be? Give all possible solutions in  $[0, 2\pi]$ .

23. If  $\tan(t) = -1$ , what might  $t$  be? Give all possible solutions in  $[0, 2\pi]$ .

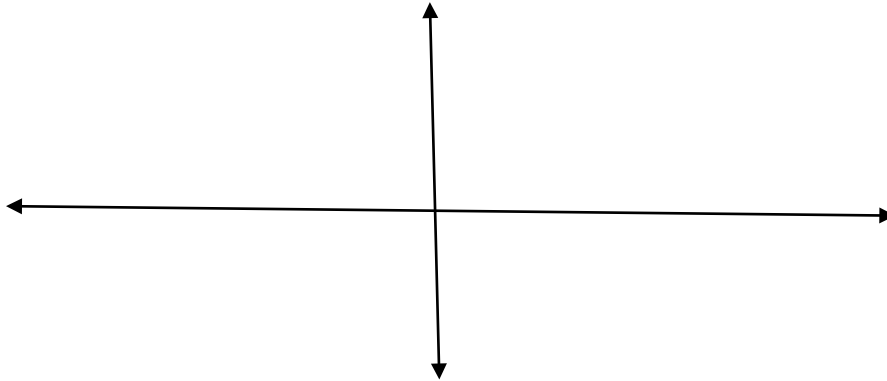
24. Find all values of  $t$  in the interval  $[0, 2\pi]$  such that  $\sin(t) = 0$ .

25. Find all values of  $t$  in the interval  $[0, 2\pi]$  such that  $\csc(t) = 2$ .

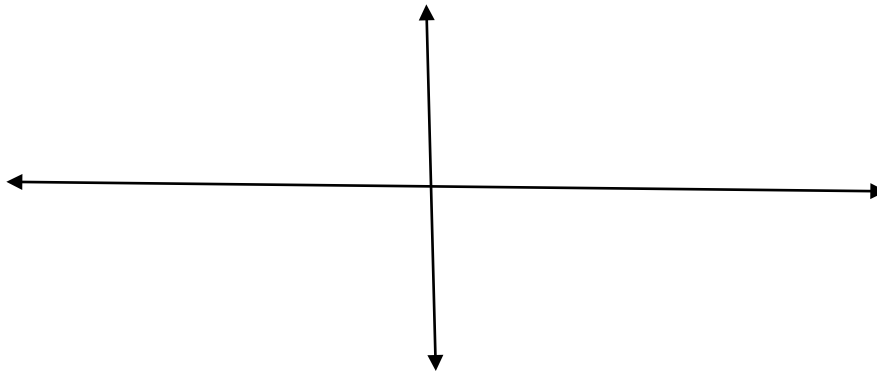
26. Graph  $\sin(x)$ ,  $\cos(x)$ , and  $\tan(x)$ . Indicate 4 critical points on each graph.



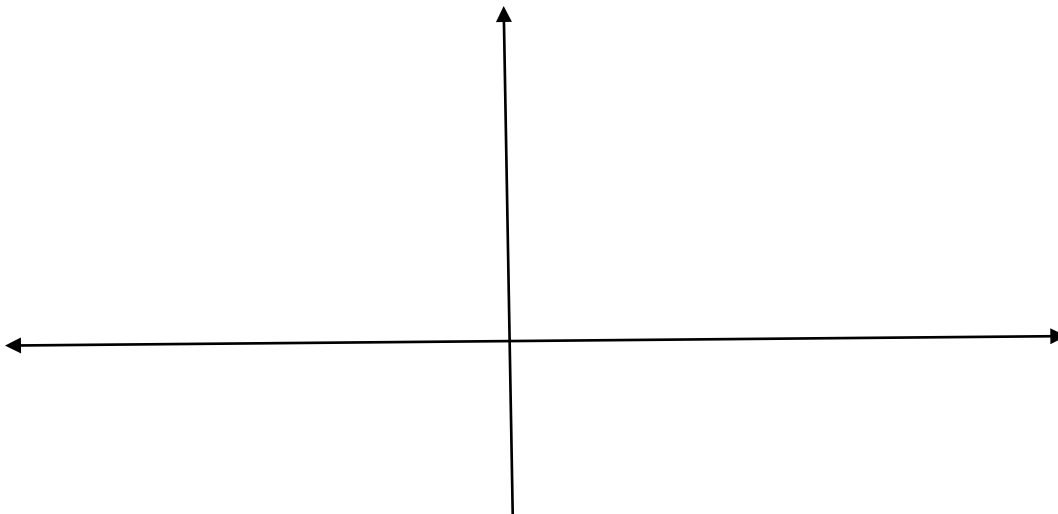
27. Graph  $f(x) = -3\sin(x)$ . When graphing, indicate at least 8 points on the x-axis.



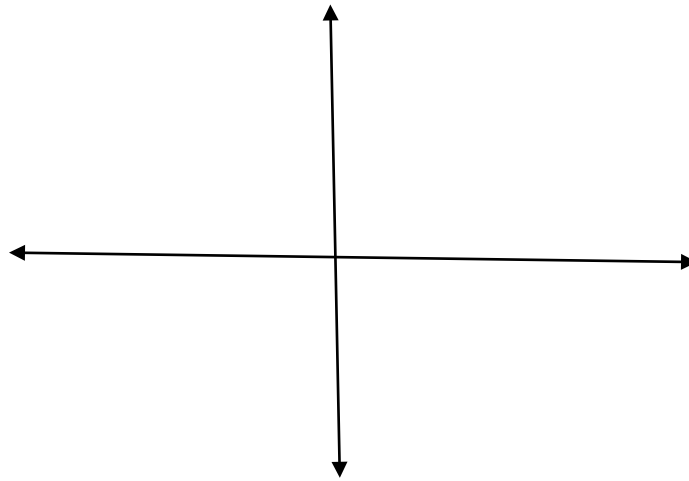
28. Graph  $g(x) = \cos\left(x - \frac{\pi}{2}\right)$ . When graphing, indicate at least 8 points on the x-axis. Can you find another function that has this same graph – If so, what is it?



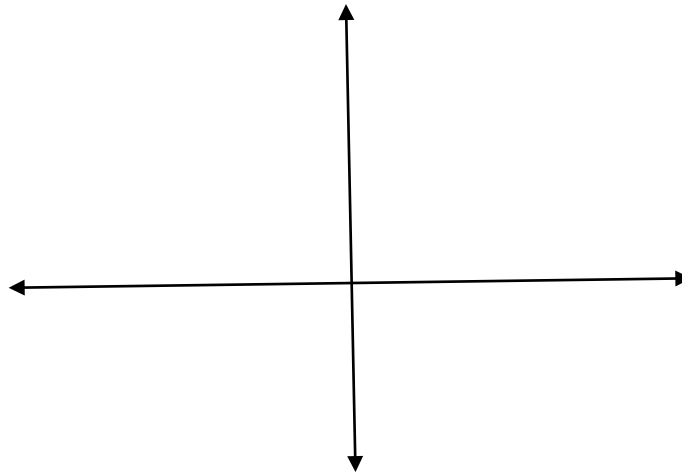
29. Graph  $h(x) = 2\sin(4x)$ . When graphing, indicate at least 8 points on the x-axis.



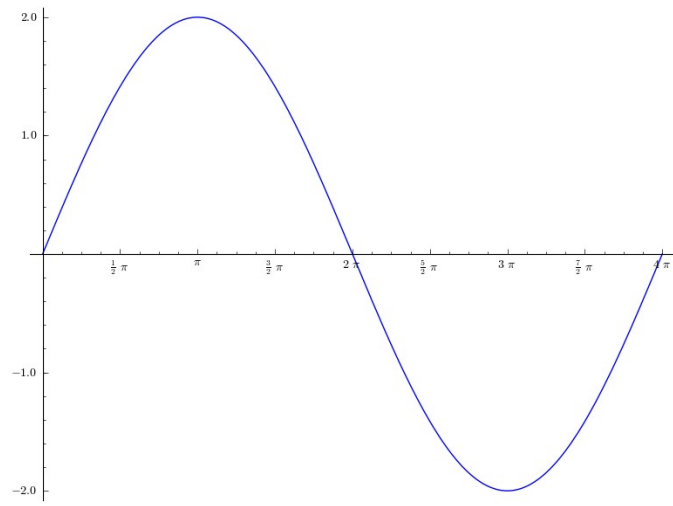
30. Where does  $\csc(x)$  have a vertical asymptote? Provide a sketch and justify your answer. When graphing, indicate at least 6 points on the x-axis



31. Graph  $2\sec(2x)$ .



32. Write an equation for this graph.



33.