Name: _____ Section: _____

Worksheet 3: Trigonometry

1. Convert 30° to radians.

2. Convert $\frac{\pi}{2}$ radians to degrees.

3. Which of the following angles correspond to the same point on the unit circle? $\frac{\pi}{4}, \frac{5\pi}{4}, \frac{9\pi}{4}, -\frac{7\pi}{4}$

4. What is the angle in the range $[\pi, 2\pi]$ that is coterminal with the angle $-\frac{\pi}{6}$?

5. What is the angle in the range $[-\pi, 0]$ that is coterminal with the angle $\frac{5\pi}{3}$?

6. Draw the unit circle. Label the angles $0, \frac{\pi}{6}, \frac{\pi}{3}, \frac{3\pi}{4}, \pi, \frac{7\pi}{6}, \frac{7\pi}{4}, 2\pi, -\frac{\pi}{4}$, and $-\frac{5\pi}{3}$, and label the coordinates of the points on the unit circle that correspond to those angles.

7. What is the angle in the range $[0, 2\pi)$ that is coterminal with the angle $\dfrac{65\pi}{6}$?

8. What is the angle in the range $[0, 2\pi)$ that is coterminal with the angle $\dfrac{14\pi}{5}$?

9. The reference angle for an angle θ is the angle in $[0, \frac{\pi}{2}]$ that is formed between the terminal side of θ in standard position and the x-axis. For example, the reference angle for $\frac{2\pi}{3}$ is $\frac{\pi}{3}$. What is the reference angle for the angle $\dfrac{7\pi}{4}$?

10. What is the reference angle for the angle $\dfrac{5\pi}{6}$?

11. What is the reference angle for the angle $\dfrac{17\pi}{5}$?

12. Evaluate $\sin(30°)$.

13. Evaluate $\csc\left(\dfrac{5\pi}{6}\right)$.

14. If $t = \dfrac{20\pi}{3}$, evaluate $\sin(t)$, $\csc(t)$, and $\cot(t)$.

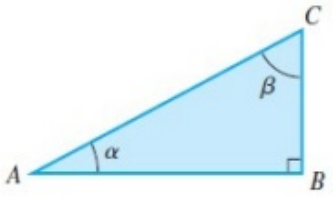
15. If $\cot(t) = 1$ and t is in the interval $[\pi, 2\pi]$, evaluate $\sin(t)$.

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

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

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

19. Use the triangle at right to answer the following questions:



(a) If $\alpha = \dfrac{\pi}{4}$ and $BC = 8$, what is AB?

(b) If $\beta = \dfrac{\pi}{6}$ and $BC = 20$, what is AC?

(c) If $AB = 5$ and $BC = 10$, what is α?

20. List all solutions to the equation $\sin(t) = \dfrac{\sqrt{2}}{2}$ in the interval $[-\pi, \pi]$.

21. List all solutions to the equation $\sin(t) = 1$ in the interval $[0, 2\pi]$.

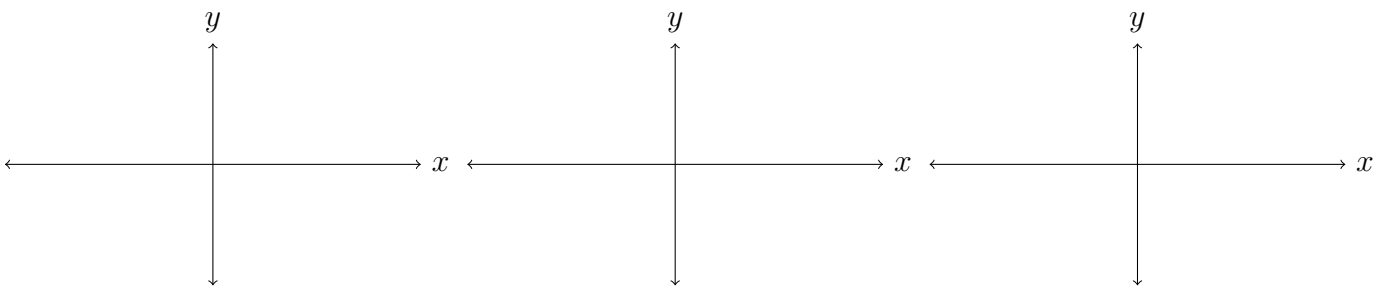
22. List all solutions to the equation $\cos(t) = 0.5$ in the interval $[0, 2\pi]$.

23. List all solutions to the equation $\tan(t) = -1$ in the interval $[0, 2\pi]$.

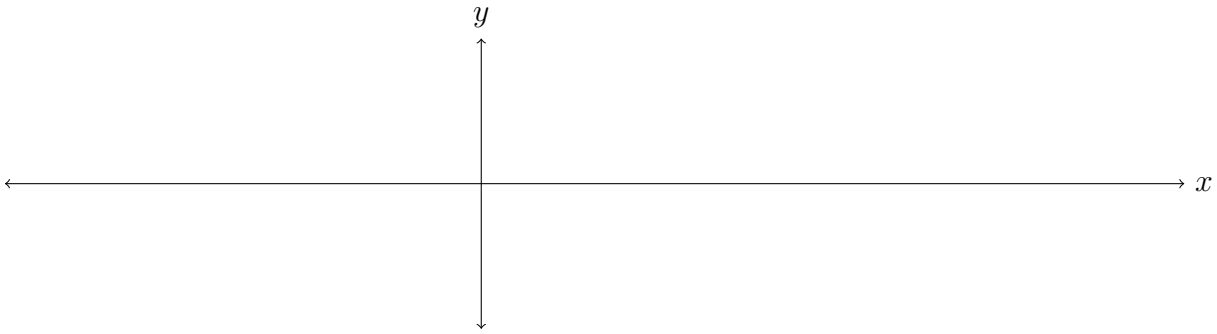
24. List all solutions to the equation $\sin(t) = 0$ in the interval $[0, 2\pi]$.

25. List all solutions to the equation $\csc(t) = 2$ in the interval $[0, 2\pi]$.

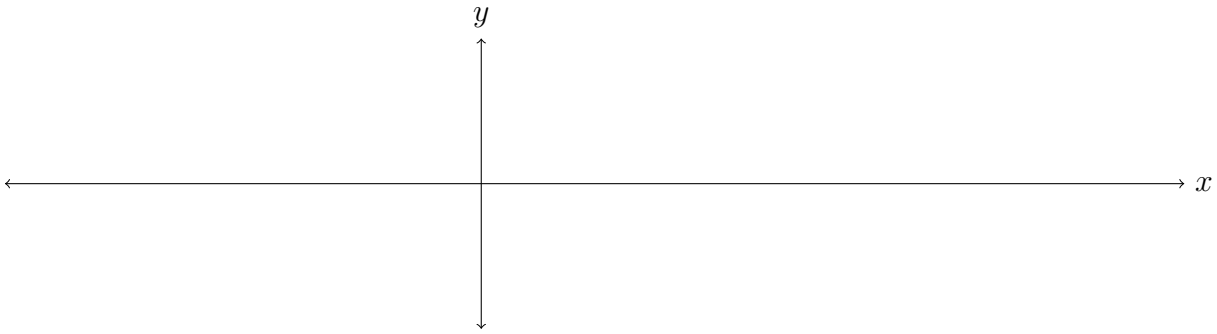
26. Sketch the graphs of $y = \sin(x), y = \cos(x)$, and $y = \tan(x)$. Indicate 4 critical points on each.



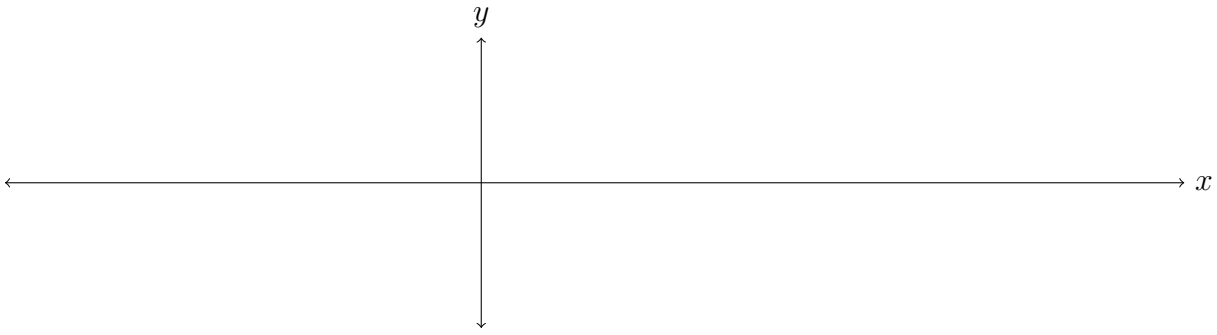
27. Sketch the graph of $f(x) = -3\sin(x)$. Label the coordinates of at least 8 points on the graph.



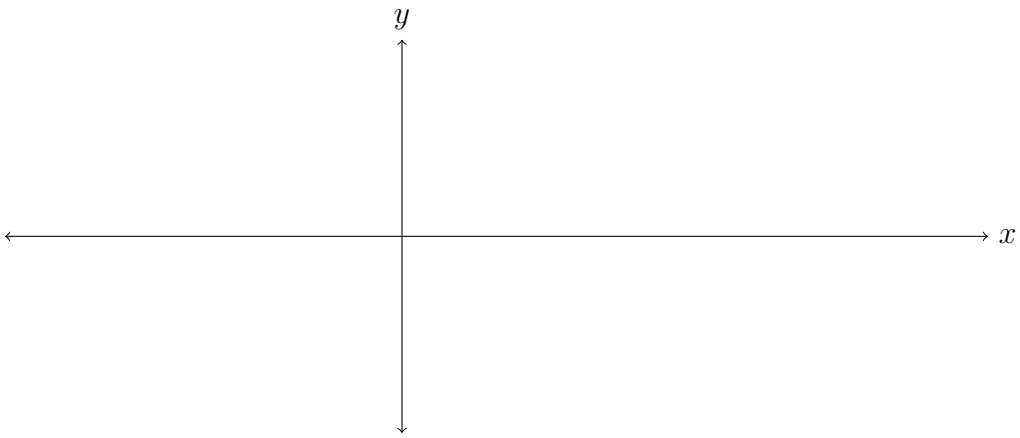
28. Sketch the graph of $g(x) = \cos\left(x - \frac{\pi}{2}\right)$. Label the coordinates of at least 8 points on the graph. Can you find another function with the same graph? If so, which function is it?



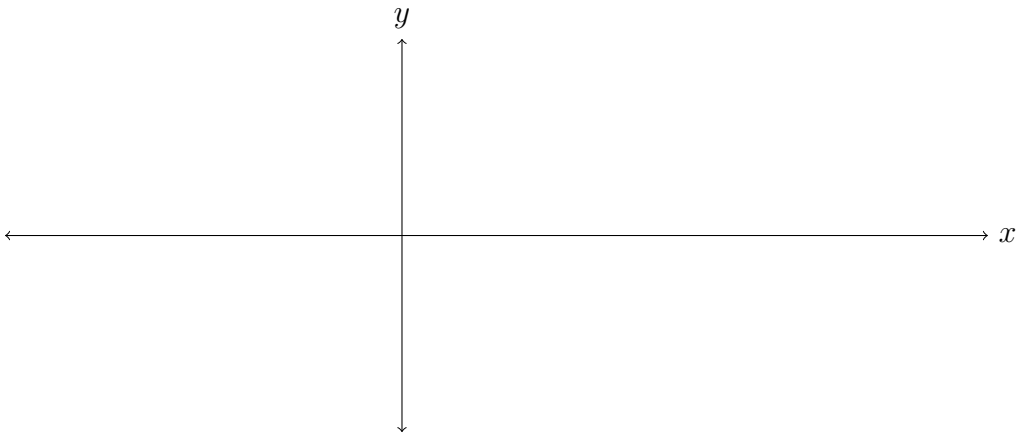
29. Sketch the graph of $f(x) = 2\sin(4x)$. Label the coordinates of at least 8 points on the graph.



30. Where does $y = \csc(x)$ have vertical asymptotes? Sketch a graph to justify your answer. Label the coordinates of at least 6 points on the graph.



31. Sketch a graph of $y = 2\sec(2x)$.



32. Write an equation for the function whose graph is shown below.