

Name _____ Date _____ Period _____

Find the exact value of each trigonometric function without a calculator or table.

1. $\sin \frac{\pi}{6}$

2. $\sec \frac{\pi}{3}$

3. $\cos \frac{\pi}{2}$

4. $\cot \frac{\pi}{6}$

5. $\tan \frac{\pi}{4}$

6. $\csc \frac{\pi}{3}$

Find the coordinates of each point after it is moved a) $\frac{\pi}{4}$ units to the right and b) $\frac{\pi}{3}$ units to the left.

7. $\left(\frac{\pi}{2}, 3\right)$ a) b)

8. $\left(\frac{\pi}{3}, 0\right)$ a) b)

Find the coordinates of each point after it is moved $\frac{\pi}{6}$ units to the right and 2 units upward.

9. $\left(\frac{-3\pi}{2}, 1\right)$ 10. $\left(\frac{\pi}{3}, -2\right)$

Determine the point that lies midway between the two given points.

11. $(\pi, 0)$ and $(2\pi, 0)$

12. $\left(\frac{\pi}{6}, 1\right)$ and $\left(\frac{\pi}{2}, 1\right)$

Determine the amplitude, period, frequency, phase shift, and range for each function.

13. $f(x) = \cos\left(x - \frac{\pi}{2}\right)$

14. $f(x) = -2 \sin\left(x + \frac{\pi}{3}\right)$

15. $f(x) = 3 \sin(4x)$

16. $f(x) = -\cos\left(\frac{x}{2}\right) + 3$

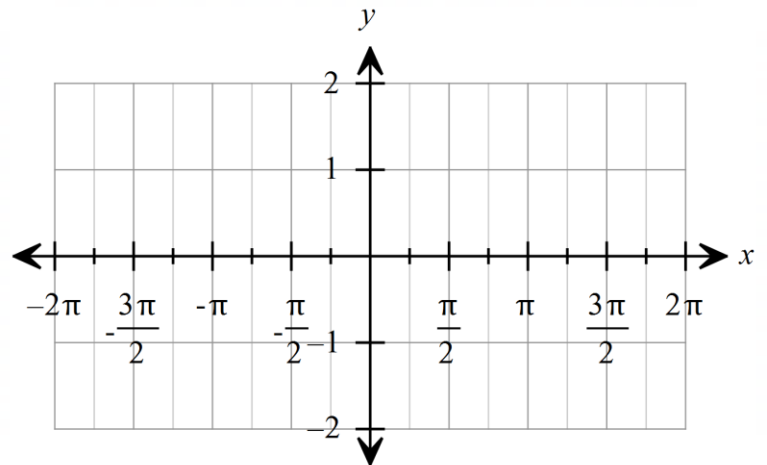
17. $f(x) = 5 - \sin(5x)$

18. $f(x) = -2 \cos\left(2x + \frac{\pi}{4}\right)$

Determine the midline, amplitude, phase shift, period, frequency, and range for each function. Make a table with the five key points and sketch at least one cycle of the graph with the five key points from the table. (See example from notes.)

19. $f(x) = -\sin(x)$

x	$f(x)$



midline _____

amplitude _____

phase shift _____

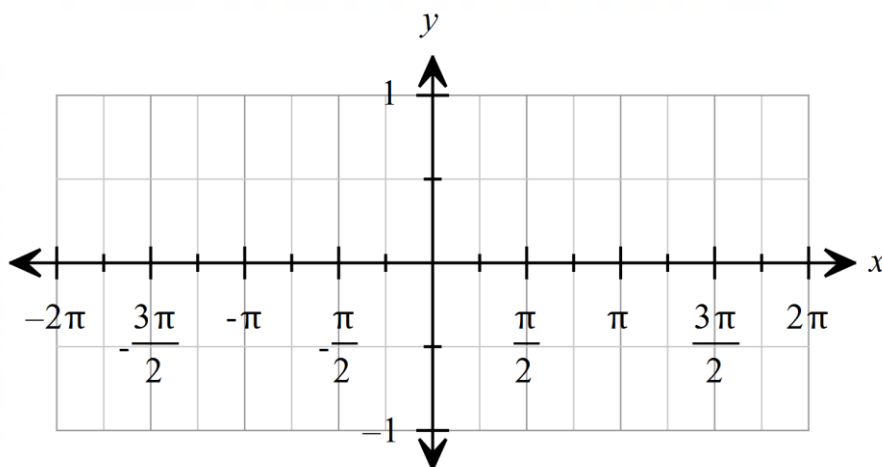
period _____

frequency _____

range _____

20. $f(x) = \frac{1}{2}\cos(x)$

x	$f(x)$



midline _____

amplitude _____

phase shift _____

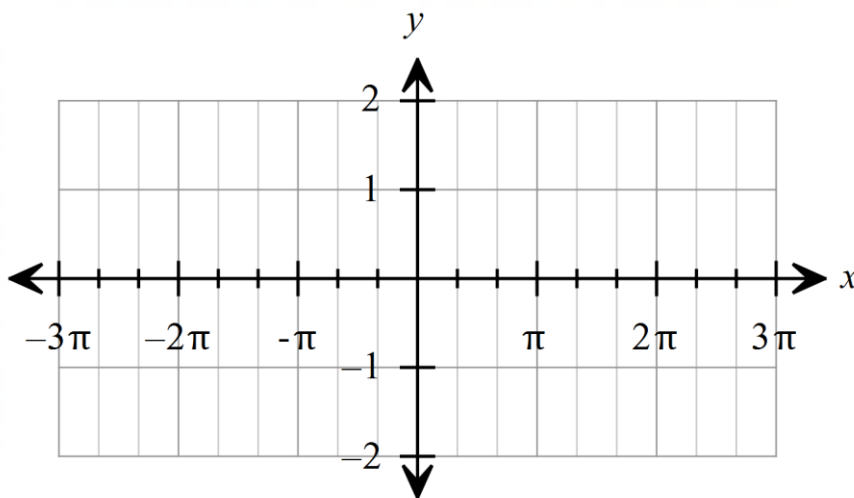
period _____

frequency _____

range _____

21. $f(x) = \cos\left(x - \frac{\pi}{3}\right)$

x	$f(x)$



midline _____

amplitude _____

phase shift _____

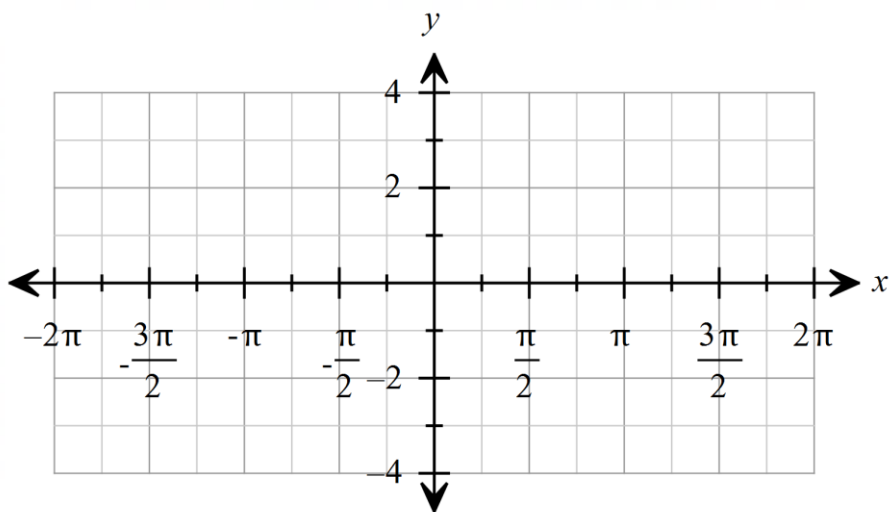
period _____

frequency _____

range _____

22. $f(x) = \sin\left(x + \frac{\pi}{4}\right) + 2$

x	$f(x)$



midline _____

amplitude _____

phase shift _____

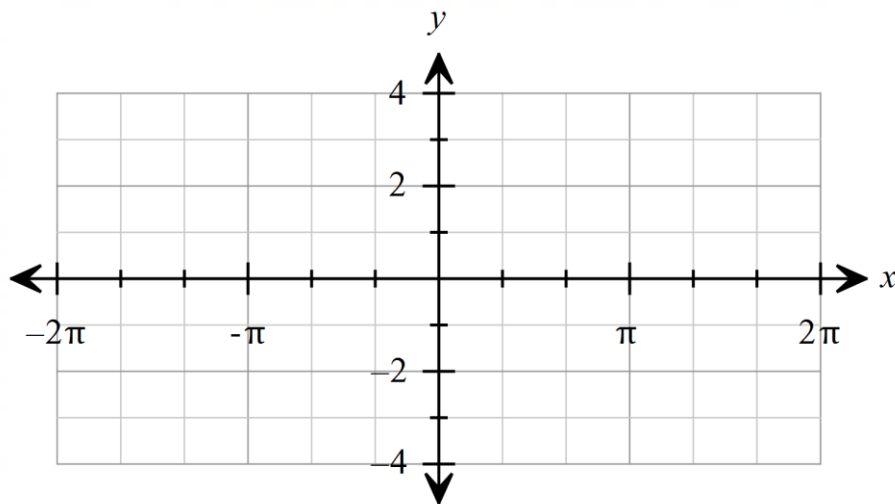
period _____

frequency _____

range _____

23. $f(x) = 2 \cos\left(x + \frac{\pi}{6}\right) + 1$

x	$f(x)$



midline _____

amplitude _____

phase shift _____

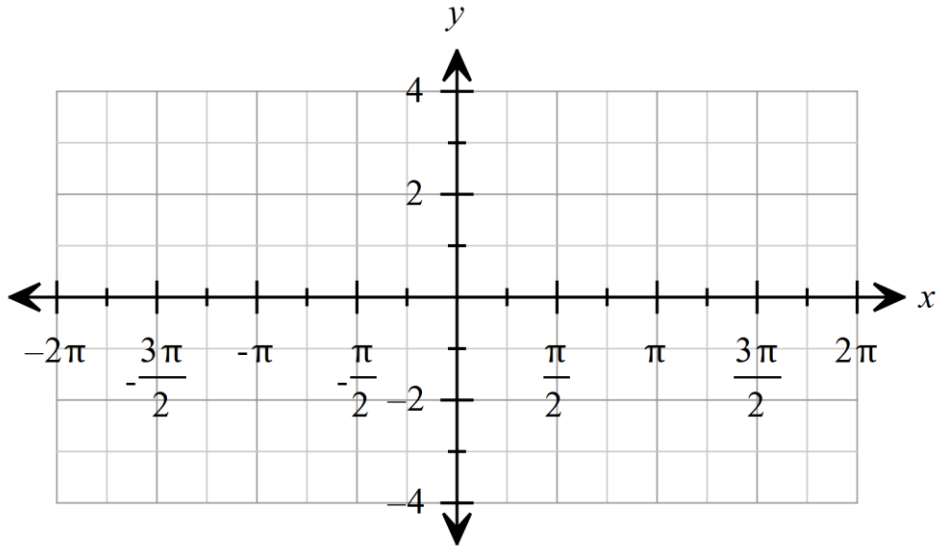
period _____

frequency _____

range _____

24. $f(x) = \cos(4x) + 2$

x	$f(x)$



midline _____

amplitude _____

phase shift _____

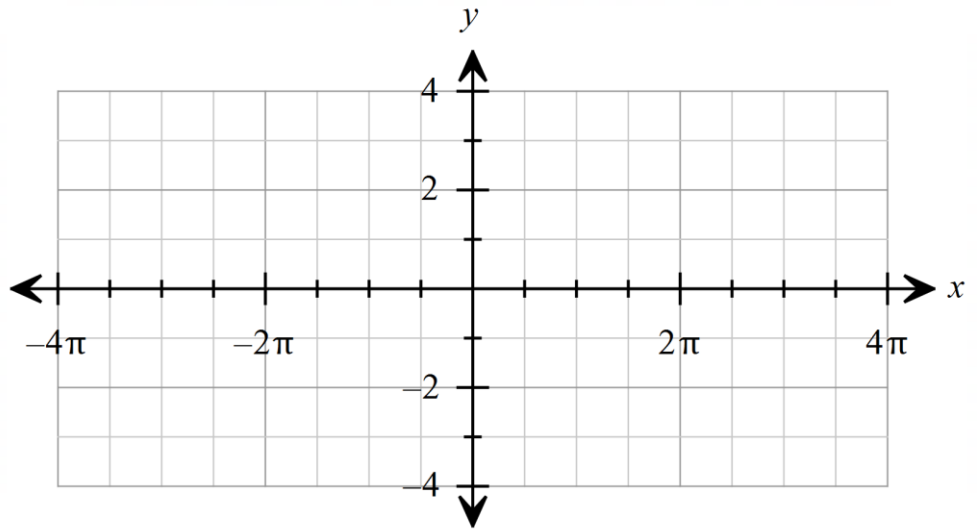
period _____

frequency _____

range _____

25. $f(x) = 2 - \sin\left(\frac{x}{4}\right)$

x	$f(x)$



midline _____

amplitude _____

phase shift _____

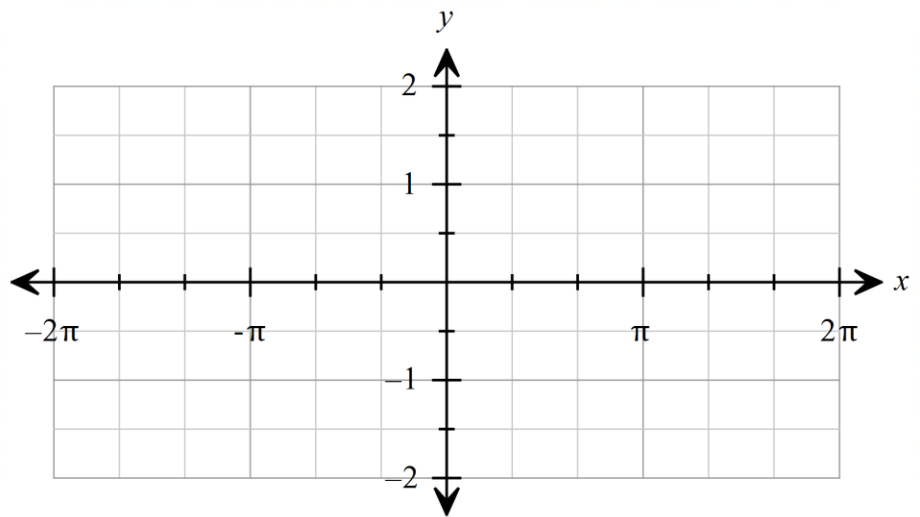
period _____

frequency _____

range _____

26. $f(x) = -\frac{1}{2} \sin\left[3\left(x - \frac{\pi}{6}\right)\right] - 1$

x	$f(x)$



midline _____

amplitude _____

phase shift _____

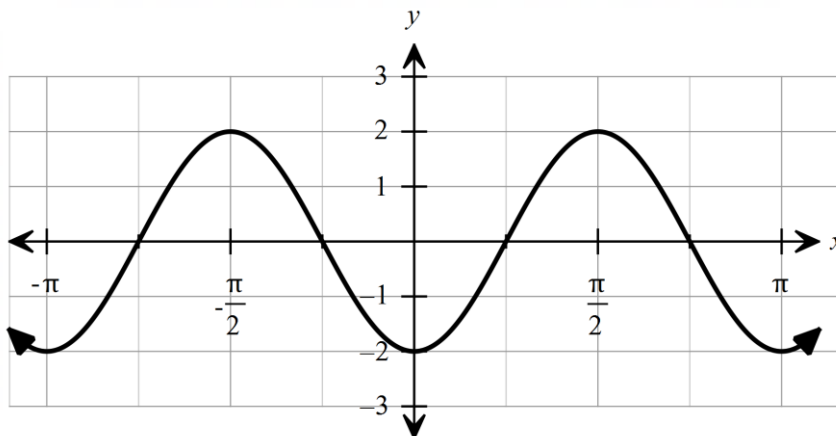
period _____

frequency _____

range _____

Write an equation of the form $y = A \sin[B(x - C)] + D$ whose graph is the given sine wave.

27.



Read and solve the following stories. Remember to define your variable and draw a picture or graph.

28. The number of hours of darkness in a coastal town can be modeled by

$$f(x) = 6.1 \cos\left[\frac{\pi}{6}(x - 2)\right] + 12.1, \text{ where } x \text{ is the month and } x=1 \text{ corresponds to January.}$$

Approximate the number of hours of darkness in April, to the nearest tenth of an hour.

29. The position of a weight attached to a spring is $s(t) = -4 \cos 5t$. What are the frequency and period of the system?

30. The position of a weight attached to a spring is $s(t) = -6 \cos 16\pi t$ inches after t seconds. What is the maximum height that the weight reaches above the equilibrium position and when does it first reach the maximum height?

Write an equation for the sine curve that has the given amplitude and period, which passes through the given point.

31. Amplitude 3, period π

32. Amplitude 2, period 4π , phase shift right $\frac{\pi}{4}$

Write an equation for the cosine curve that has the given amplitude and period, which passes through the given point.

33. Amplitude 3, period $\frac{\pi}{2}$, phase shift left $\frac{\pi}{2}$

34. Amplitude 1.5, period 4π , vertical shift up 2