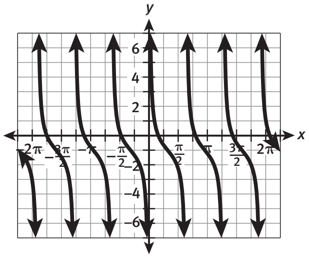
ACTIVITY 34 PRACTICE

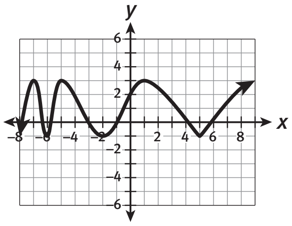
Lesson 34-1

State whether each graph in Items 1–4 shows a periodic function. If periodic, give the period, amplitude, and the equation of the midline. If not periodic, explain why not.

1.



2.



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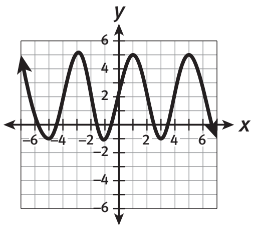

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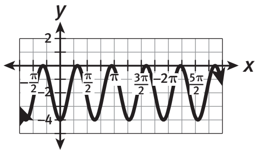


5. How can you use the maximum and minimum y-values of a periodic function to find the equation of the midline?

6. Draw the graph of a periodic function that has a period of 3, an amplitude of 2.5, and a midline of $y = 0.5$.

Lesson 34-2

Name the period and amplitude of each function. Graph at least one period of each on a separate coordinate plane.

7. $y = 4 \sin x$

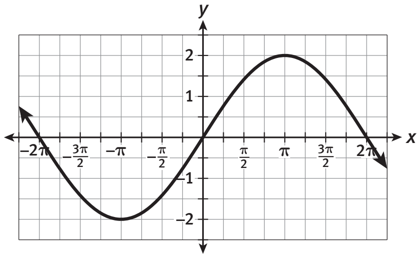
8. $y = \frac{1}{4} \sin x$

9. $y = \sin 4x$

10. $y = \sin \frac{1}{4} x$

11. $y = \frac{5}{2} \sin \frac{2}{5} x$

Refer to the graph below for Items 12–14.



12. What is the period and amplitude of the graph?

13. What is the equation of the function?

14. What is the equation of a graph that is half as wide and twice as tall as the one shown?

Lesson 34-3

Name the period and amplitude of each function. Graph at least one period of each on a separate coordinate plane.

15. $y = 3 \cos x$

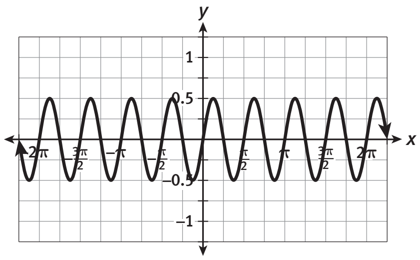
16. $y = \frac{2}{3} \cos x$

17. $y = \cos 3x$

18. $y = \cos \frac{2}{3} x$

19. $y = \frac{3}{2} \cos \frac{1}{3} x$

Refer to the graph below for Items 20–21.



20. What is the period and amplitude of the graph?

21. What is the equation of the function?

Suppose a graphic designer wanted to use the cosine function to create a mural. However, she wanted it to appear three times narrower than the parent cosine function. She was not sure whether to use the graph of $y = 3 \cos x$ or the graph of $y = \cos 3x$.

22. Graph $y = \cos x$ and $y = 3 \cos x$ on the same coordinate axis. Compare and contrast the graphs of the two functions.

23. Graph $y = \cos x$ and $y = \cos 3x$ on the same coordinate axis. Compare and contrast the graphs of the two functions

24. Which equation results in a graph three times narrower than $y = \cos x$? Explain.

Lesson 34-4

Name the period, zeros, and asymptotes of each function. Graph at least one period of each on a separate coordinate plane.

25. $y = \frac{3}{2} \tan x$

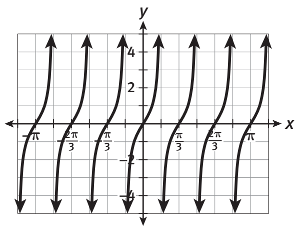
26. $y = \frac{1}{2} \tan x$

27. $y = \tan \frac{2}{3} x$

28. $y = \tan \frac{3}{2} x$

29. $y = 2 \tan \frac{1}{4} x$

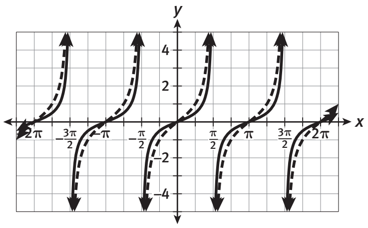
Refer to the graph below for Items 30–31.



30. Name the period, zeros, and asymptotes of the graph.

31. What is the equation of the function?

Refer to the graph below for Items 32–34.



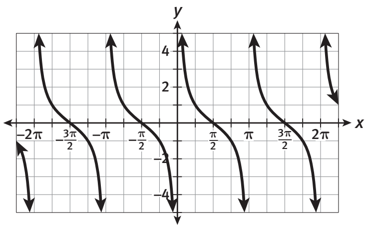
32. Name the period, zeros, and asymptotes of both graphs.

33. What is the value of $f\left(\frac{\pi}{4}\right)$ for the function shown by the dashed line?

34. What is the value of $f\left(\frac{\pi}{4}\right)$ for the function shown by the solid line?

35. What is the equation of the function shown by the dashed line? the solid line?

36. George graphed $y = \tan x$ as shown below. The teacher marked it wrong. He argued that the zeros and asymptotes were correct. He did not understand what was wrong with it. Explain why it is incorrect.



Lesson 34-5

For each function, describe the phase (horizontal) shift and vertical shift relative to the parent function. Then graph it.

37. $y = \cos\left(x + \frac{\pi}{4}\right) + 2$

38. $y = \cos\left(x - \frac{2\pi}{3}\right) - 3$

39. $y = \tan\left(x - \frac{\pi}{3}\right) + 2$

40. $y = \tan\left(x + \frac{\pi}{2}\right) - 1$

41. $y = \sin\left(x - \frac{\pi}{2}\right) - 2$

42. $y = \sin(x + \pi) + 1$

Describe the meaning of the "2" in each function and its effect on the graph of each function relative to the parent function.

43. $y = 2 \cos x$

44. $y = \cos 2x$

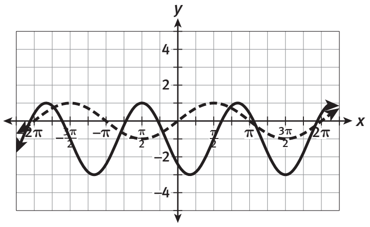
45. $y = \cos(x + 2)$

46. $y = \cos x + 2$

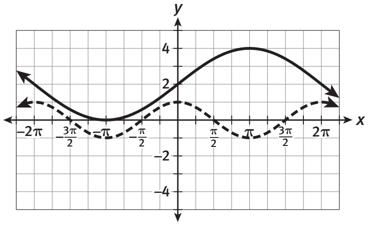
MATHEMATICAL PRACTICES
Make Sense of Problems

In each graph below, the parent trigonometric function is shown with a dashed line. Name the amplitude change (a), period change (b), phase (horizontal) shift (h), and vertical shift (k) shown by the function graphed with a solid line. Then write its equation in the form $y = a \sin b(x - h) + k$, $y = a \cos b(x - h) + k$, or $y = a \tan b(x - h) + k$.

47.



48.



49.