

CHAPTER 4 TEST

Graph each of the following between $x = -4\pi$ and $x = 4\pi$.

1. $y = \sin x$

2. $y = \cos x$

3. $y = \tan x$

4. $y = \sec x$

- How many complete cycles of the graph of the equation $y = \sin x$ are shown in your answer to Problem 1?
- How many complete cycles of the graph of the equation $y = \tan x$ are shown in your answer to Problem 3?
- Use your answer to Problem 2 to find all values of x between -4π and 4π for which $\sec x = -1$.
- Use your answer to Problem 2 to find all values of x between -4π and 4π for which $\sec x$ is undefined.

For each equation below, first identify the amplitude and period and then use this information to sketch one complete cycle of the graph.

9. $y = \cos \pi x$

10. $y = -3 \cos x$

Graph each of the following on the given interval.

11. $y = 2 + 3 \sin 2x, -\pi \leq x \leq 2\pi$

12. $y = 2 \sin \pi x, -4 \leq x \leq 4$

For each equation below, identify the amplitude, period, and phase shift and then use this information to sketch one complete cycle of the graph.

13. $y = \sin \left(x + \frac{\pi}{4} \right)$

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

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

16. $y = -3 + 3 \sin \left(\frac{\pi}{3}x - \frac{\pi}{3} \right)$

17. $y = \csc \left(x + \frac{\pi}{4} \right)$

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

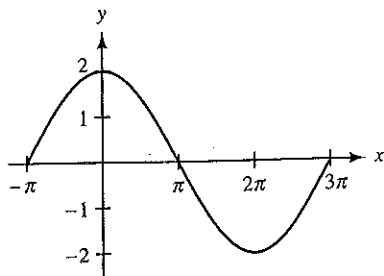
Graph each of the following on the given interval.

19. $y = 2 \sin (3x - \pi), -\frac{\pi}{3} \leq x \leq \frac{5\pi}{3}$

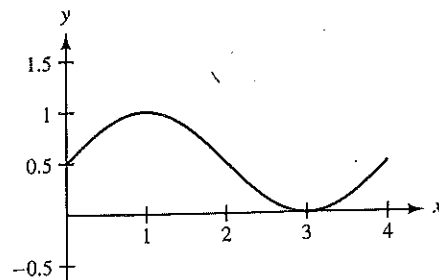
20. $y = 2 \sin \left(\frac{\pi}{2}x - \frac{\pi}{4} \right), -\frac{1}{2} \leq x \leq \frac{13}{2}$

Find an equation for each of the following graphs.

21.



22.



Sketch the following between $x = 0$ and $x = 4\pi$.

23. $y = \frac{1}{2}x - \sin x$

24. $y = \sin x + \cos 2x$

Graph each of the following.

25. $y = \cos^{-1} x$

26. $y = \arcsin x$

Evaluate each expression without using a calculator and write your answer in radians.

27. $\sin^{-1}\left(\frac{1}{2}\right)$

28. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

29. $\arctan(-1)$

30. $\arcsin(1)$

Use a calculator to evaluate each expression to the nearest tenth of a degree.

31. $\arcsin(0.5934)$

32. $\arctan(-0.8302)$

33. $\arccos(-0.6981)$

34. $\arcsin(-0.2164)$

Evaluate without using a calculator.

35. $\tan\left(\cos^{-1}\frac{2}{3}\right)$

36. $\cos\left(\tan^{-1}\frac{2}{3}\right)$

37. $\cos^{-1}(\cos 30^\circ)$

38. $\tan^{-1}\left(\tan\frac{7\pi}{6}\right)$

For each expression below, write an equivalent expression that involves x only.

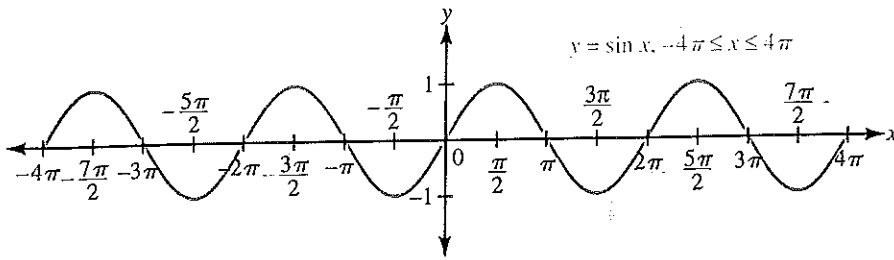
39. $\sin(\cos^{-1} x)$

40. $\tan(\sin^{-1} x)$

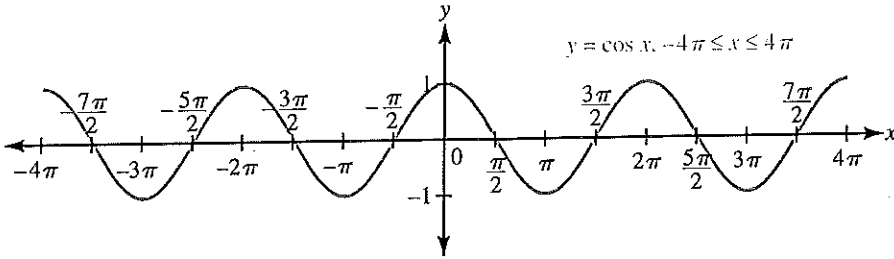
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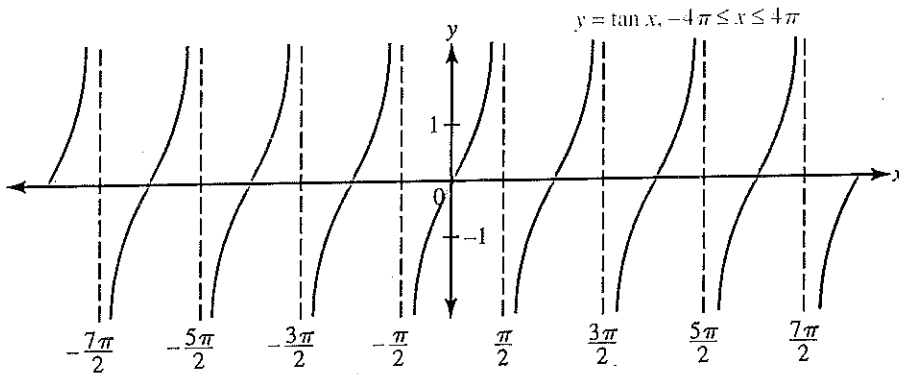
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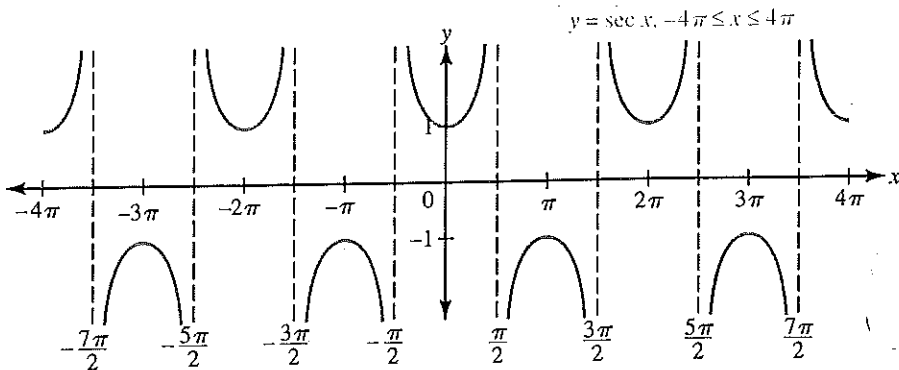
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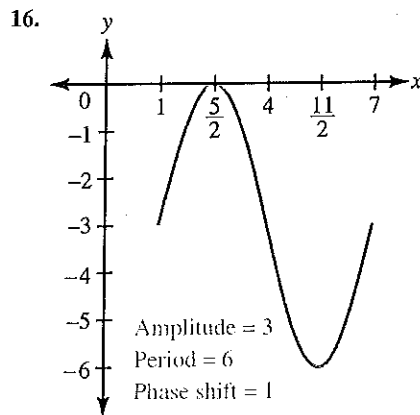
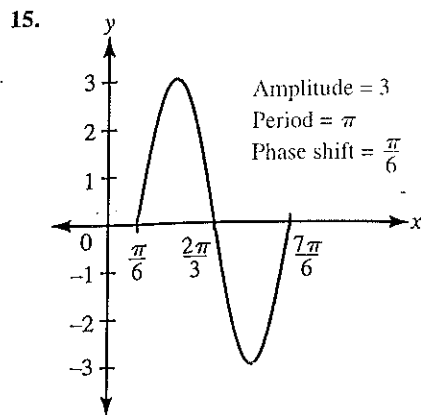
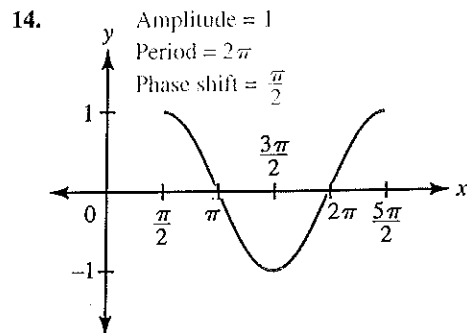
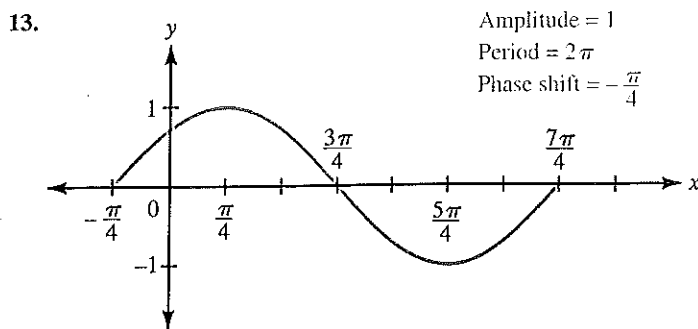
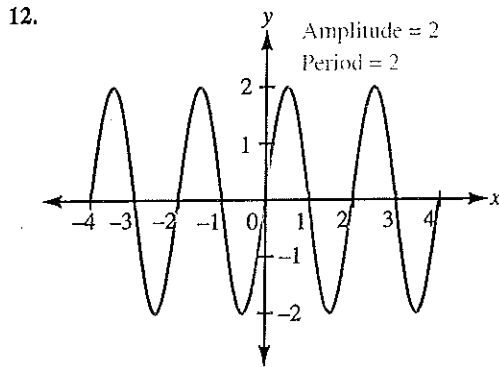
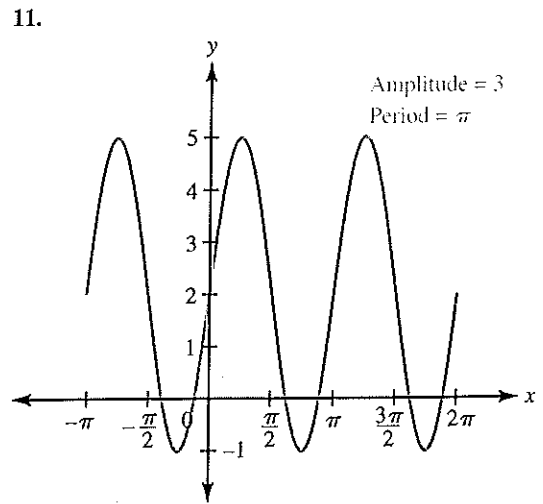
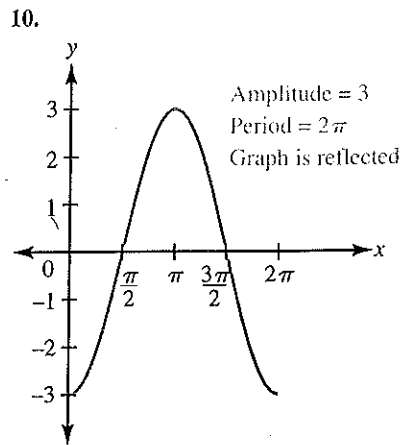
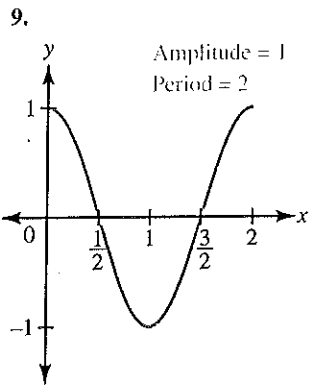
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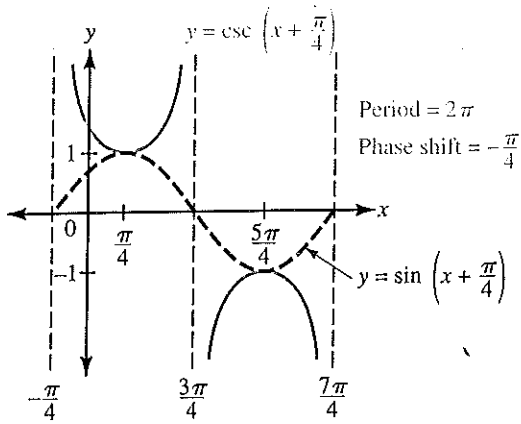
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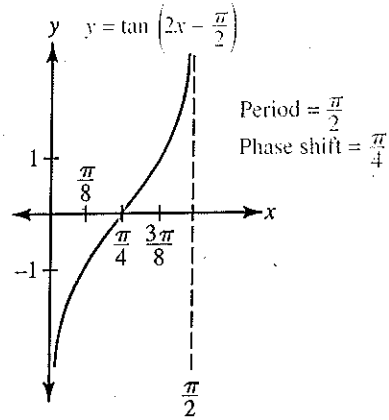
5. 4 6. 8 7. $-3\pi, -\pi, \pi, 3\pi$ 8. $-\frac{7\pi}{2}, -\frac{5\pi}{2}, -\frac{3\pi}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \frac{7\pi}{2}$



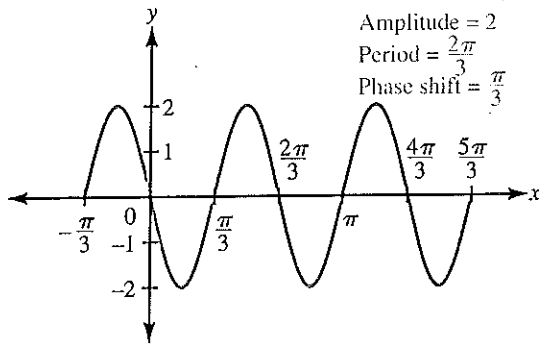
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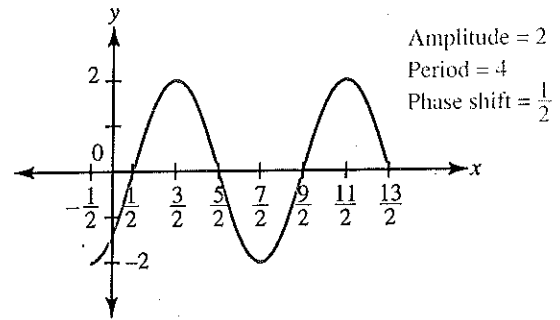
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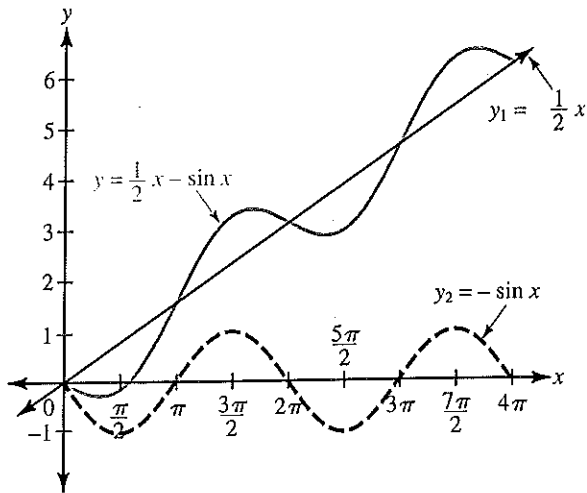


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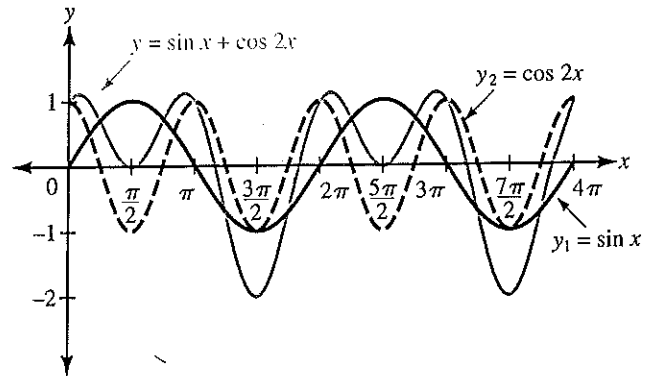


21. $y = 2 \sin\left(\frac{1}{2}x + \frac{\pi}{2}\right)$ 22. $y = \frac{1}{2} + \frac{1}{2} \sin \frac{\pi}{2}x$

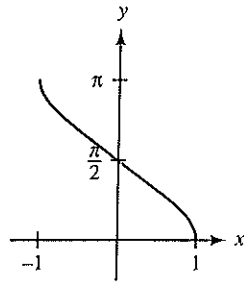
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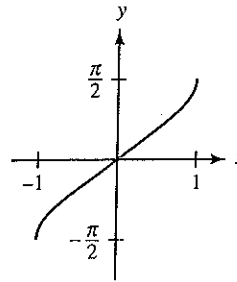
24.



25.



26.



27. $\frac{\pi}{6}$ 28. $\frac{5\pi}{6}$ 29. $-\frac{\pi}{4}$ 30. $\frac{\pi}{2}$ 31. 36.4° 32. -39.7° 33. 134.3° 34. -12.5° 35. $\frac{\sqrt{5}}{2}$
 36. $\frac{3}{\sqrt{13}}$ 37. 30° 38. $\frac{\pi}{6}$ 39. $\sqrt{1-x^2}$ 40. $\frac{x}{\sqrt{1-x^2}}$

CHAPTER 5

PROBLEM SET 5.1

For some of the problems in the beginning of this problem set we will give the complete proof. Remember, however, that there is often more than one way to prove an identity. You may have a correct proof even if it doesn't match the one you find here. As the problem set progresses, we will give hints on how to begin the proof instead of the complete proof. Solutions to problems not shown are given in the Solutions Manual.

$$1. \cos \theta \tan \theta = \cos \theta \cdot \frac{\sin \theta}{\cos \theta} = \sin \theta$$

$$9. \cos x(\csc x + \tan x) = \cos x \csc x + \cos x \tan x$$

$$\begin{aligned} &= \cos x \cdot \frac{1}{\sin x} + \cos x \cdot \frac{\sin x}{\cos x} \\ &= \frac{\cos x}{\sin x} + \sin x \\ &= \cot x + \sin x \end{aligned}$$

$$17. \frac{\cos^4 t - \sin^4 t}{\sin^2 t} = \frac{(\cos^2 t + \sin^2 t)(\cos^2 t - \sin^2 t)}{\sin^2 t} = \frac{\cos^2 t - \sin^2 t}{\sin^2 t} = \frac{\cos^2 t}{\sin^2 t} - \frac{\sin^2 t}{\sin^2 t} = \cot^2 t - 1$$

19. Write the numerator on the right side as $1 - \sin^2 \theta$ and then factor it. 25. Factor the left side and then write it in terms of sines and cosines. 27. Change the left side to sines and cosines and then add the resulting fractions. 33. See Example 6 in this section. 37. Rewrite the left side in terms of cosine and then simplify. 67. Is an identity 69. Not an identity
 71. Not an identity 73. Is an identity

75. $-\frac{\pi}{3}$ is one possible answer. 77. 0 is one possible answer. 79. $\frac{\pi}{4}$ is one possible answer.

81. See the Solutions Manual. 83. $\cos A = \frac{4}{5}, \tan A = \frac{3}{4}$ 85. $\frac{\sqrt{3}}{2}$ 87. $\frac{\sqrt{3}}{2}$ 89. 15° 91. 105°