Exercises 1.4

1. Give the amplitude of each of the following functions.

a. $f(x) = \frac{1}{3}\cos x$. b. $g(x) = 3\cos x$. c. $h(x) = -2\sin x$.

d. $f(x) = \frac{1}{2}\sin x$. e. $g(x) = \frac{4}{3}\cos x$. f. $h(x) = \frac{5}{9}\sin x$.

g. $f(x) = \frac{-9}{5}\sin x$. h. $g(x) = -17\cos x$. i. $h(x) = -6\cos x$.

Graph the following functions.

2. $\{(x, y) \mid y = 3\sin x\}$

3. $\{(x, y) \mid y = -2\cos x\}$

4. $\left\{(x, y) \mid y = \frac{3}{2}\cos x\right\}$

5. $\left\{(x, y) \mid y = -\frac{1}{2}\sin x\right\}$

6. $\left\{(x, y) \mid y = \cos\left(-\frac{x}{4}\right)\right\}$

7. $\left\{(x, y) \mid y = \sin\frac{x}{3}\right\}$

8. $\{(x, y) \mid y = \sin 4x\}$

9. $\{(x, y) \mid y = \cos(-3x)\}$

10. $\left\{(x, y) \mid y = \frac{1}{2}\cos 3x\right\}$

11. $\{(x, y) \mid y = 3\sin 2x\}$

12. $\left\{(x, y) \mid y = 4\cos\frac{x}{3}\right\}$

13. $\left\{(x, y) \mid y = -\frac{3}{2}\sin\frac{x}{2}\right\}$

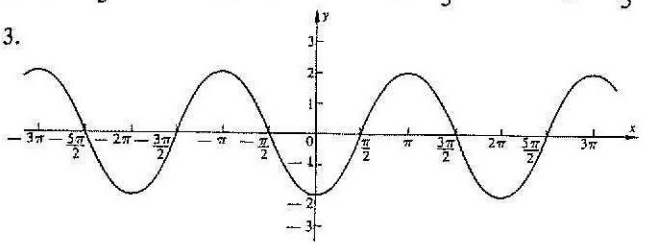
14. $\{(x, y) \mid y = -2\cos 2\pi x\}$

15. $\{(x, y) \mid y = 2\sin \pi x\}$

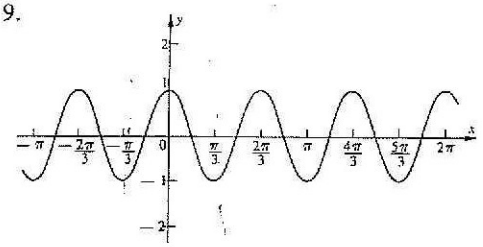
Exercises 1.4

1. a. $\frac{1}{3}$ c. 2 e. $\frac{4}{3}$ g. $\frac{9}{5}$ i. 6

3.

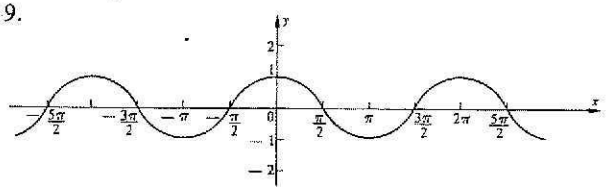


9.

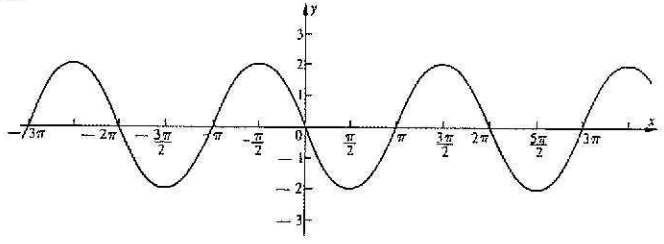


Exercises 1.5

1. $1, -\frac{\pi}{2}, 2\pi$
3. $1, -\frac{\pi}{2}, \pi$
5. $2, -\pi, 2\pi$
7. $3, \frac{\pi}{4}, \pi$
9.



13.



Exercises 1.6

1. a. $\tan(-x) = -\tan x$.
   b. $\sec(-x) = \sec x$.
   c. $\cot(-x) = -\cot x$.
   d. $\csc(-x) = -\csc x$.
2. a. -1
   c. $\frac{-2}{\sqrt{3}}$ or $\frac{-2\sqrt{3}}{3}$
   e. 2
   g. $-\frac{1}{\sqrt{3}}$
   i. $-\sqrt{3}$
   k. $-\sqrt{3}$
3. a. $\tan(\pi - x) = -\tan x$.
   b. $\cot(\pi - x) = -\cot x$.
   c. $\sec(\pi - x) = -\sec x$.
   d. $\csc(\pi - x) = \csc x$.
4. a. -1
   c. $\frac{2}{\sqrt{3}}$ or $\frac{2\sqrt{3}}{3}$
   e. -2
   g. $-\frac{1}{\sqrt{3}}$

   i. $-\sqrt{3}$
   k. 2
5. a. $\tan(x + \pi) = \tan x$.
   b. $\cot(x + \pi) = \cot x$.
   c. $\sec(x + \pi) = -\sec x$.
   d. $\csc(x + \pi) = -\csc x$.
6. a. $-\sqrt{2}$
   c. $\sqrt{3}$
   e. $-\sqrt{2}$
   g. $\frac{1}{\sqrt{3}}$
   i. 1
   k. $-\frac{2}{\sqrt{3}}$ or $-\frac{2\sqrt{3}}{3}$
7. $\sin x = -\frac{12}{13}, \cos x = -\frac{5}{13}, \tan x = \frac{12}{5}, \cot x = \frac{5}{12}, \csc x = -\frac{13}{12}$.
9. $\sin x = \frac{1}{\sqrt{5}}, \cos x = \frac{2}{\sqrt{5}}, \cot x = 2, \sec x = \frac{\sqrt{5}}{2}, \csc x = \sqrt{5}$.
11. $\sin x = -\frac{3}{\sqrt{13}}, \tan x = -\frac{3}{2}, \cot x = -\frac{2}{3}, \sec x = \frac{\sqrt{13}}{2}, \csc x = -\frac{\sqrt{13}}{3}$
13. $\sin x = -\frac{3}{\sqrt{10}}, \cos x = -\frac{1}{\sqrt{10}}, \tan x = 3, \sec x = -\sqrt{10}, \csc x = -\frac{\sqrt{10}}{3}$.

Review Exercises

1. a. $\frac{\sqrt{2}}{2}$ c. $\frac{1}{\sqrt{3}}$ e. 1 g. $\frac{1}{2}$ i. $\frac{1}{\sqrt{3}}$ k. $-\frac{2}{\sqrt{3}}$
12. a. $-\frac{\sqrt{2}}{2}$ c. 1 e. 1 g. $-\frac{\sqrt{3}}{2}$ i. 2

Chapter 2

Exercises 2.1

1. $\frac{\pi}{6} \in \mathscr{D}$; $\cos\frac{\pi}{6} - \sin\frac{\pi}{6} = \frac{\sqrt{3}}{2} - \frac{1}{2} = \frac{\sqrt{3} - 1}{2} \neq 1$.
5. $0 \in \mathscr{D}$; $\cos(2 \cdot 0) = \cos 0 = 1$; $2\cos 0 = 2(1) = 2 \neq 1$.
9. $\pi \in \mathscr{D}$; $\sin\frac{\pi}{2} = 1$; $\frac{1}{2}\sin\pi = \frac{1}{2}(0) = 0 \neq 1$.
13. $\frac{\pi}{6} \in \mathscr{D}$; $\dfrac{\tan\frac{\pi}{6} + 1}{\sin\frac{\pi}{6}} = \dfrac{\frac{1}{\sqrt{3}} + 1}{\frac{1}{2}}$

$= 2\left(\frac{1}{\sqrt{3}} + 1\right) = \frac{2}{\sqrt{3}} + 2$; $\sec\frac{\pi}{6} = \frac{2}{\sqrt{3}} \neq \frac{2}{\sqrt{3}} + 2$.

Exercises 2.2

The equations in exercises 9, 22, and 23 are conditional equations.

10. $\cos\theta\cos(-\theta) - \sin\theta\sin(-\theta) = (\cos\theta)(\cos\theta) - (\sin\theta)(-\sin\theta)$
$= \cos^2\theta + \sin^2\theta$
$= 1$.