

Exercises 1.1

1. In which quadrant does the given point lie?

- ~~a. $\frac{3\pi}{4}$~~ b. $-\frac{9\pi}{7}$ ~~c. $\frac{11\pi}{3}$~~ d. $\frac{7\pi}{6}$
~~e. $-\frac{7\pi}{4}$~~ f. $-\frac{7\pi}{6}$ ~~g. $-\frac{\pi}{3}$~~ h. $\frac{13\pi}{6}$

2. Give four other real numbers which correspond to the same point on the unit circle as the given number.

- ~~a. $\frac{\pi}{3}$~~ ~~b. $\frac{\pi}{6}$~~ ~~c. $\frac{3\pi}{4}$~~ d. $\frac{4\pi}{3}$ ~~e. $\frac{5\pi}{6}$~~ f. $\frac{\pi}{4}$

Name a point which is symmetric to the given point with respect to (a) the u -axis; (b) the v -axis; (c) the origin.

- ~~1. $\frac{\pi}{6}$~~ 4. $\frac{\pi}{3}$ 5. $\frac{3\pi}{4}$ 6. $\frac{5\pi}{8}$
 7. $\frac{3\pi}{7}$ 8. $\frac{5\pi}{9}$ 9. $\frac{\pi}{12}$ ~~10. $\frac{\pi}{10}$~~

Exercises 1.2

1. a. If x has coordinates (u, v) , what coordinates does $-x$ have?
 b. $\cos x = u$. What is $\cos(-x)$?
 c. $\sin x = v$. What is $\sin(-x)$?

NEED

2. Find the following function values.

- ~~a. $\cos\left[-\frac{\pi}{3}\right]$~~ ~~b. $\cos\left[-\frac{\pi}{4}\right]$~~ ~~c. $\cos\left[-\frac{\pi}{6}\right]$~~
~~d. $\sin\left[-\frac{\pi}{3}\right]$~~ ~~e. $\sin\left[-\frac{\pi}{4}\right]$~~ f. $\sin\left[-\frac{\pi}{6}\right]$

3. a. If x has coordinates (u, v) , what coordinates does $x + \pi$ have?
 b. What is $\cos(x + \pi)$?
 c. What is $\sin(x + \pi)$?

4. Find the following function values.

- ~~a. $\cos\frac{7\pi}{6}$~~ b. $\cos\frac{5\pi}{4}$ ~~c. $\cos\frac{4\pi}{3}$~~
~~d. $\sin\frac{7\pi}{6}$~~ ~~e. $\sin\frac{5\pi}{4}$~~ f. $\sin\frac{4\pi}{3}$

5. a. If x has coordinates (u, v) , what coordinates does $\pi - x$ have?
 b. What is $\cos(\pi - x)$?
 c. What is $\sin(\pi - x)$?

6. Find the following function values.

- ~~a. $\cos\frac{3\pi}{4}$~~ b. $\cos\frac{2\pi}{3}$ ~~c. $\cos\frac{5\pi}{6}$~~
~~d. $\sin\frac{3\pi}{4}$~~ ~~e. $\sin\frac{2\pi}{3}$~~ f. $\sin\frac{5\pi}{6}$

7. If x has coordinates (u, v) , what coordinates does $x \pm 2\pi$ have?

- a. What is $\cos(x + 2\pi)$? b. What is $\sin(x + 2\pi)$?
c. What is $\cos(x - 2\pi)$? d. What is $\sin(x - 2\pi)$?

8. Use the results of exercises 1-7 to find the following function values.

- a. $\cos\left[\frac{7\pi}{4}\right]$ b. $\cos\left[-\frac{7\pi}{6}\right]$ c. $\cos\left[\frac{10\pi}{3}\right]$
d. $\sin\left[-\frac{5\pi}{4}\right]$ e. $\sin\left[\frac{11\pi}{6}\right]$ f. $\sin\left[-\frac{4\pi}{3}\right]$
g. $\sin\left[-\frac{5\pi}{6}\right]$ h. $\sin\left[\frac{8\pi}{3}\right]$ i. $\sin\left[-\frac{9\pi}{4}\right]$
j. $\cos\left[\frac{5\pi}{6}\right]$ k. $\cos\left[-\frac{11\pi}{6}\right]$ l. $\cos\left[\frac{13\pi}{4}\right]$

9. x is in the second quadrant, $\cos x = -\frac{15}{17}$. Find $\sin x$.

10. x is in the fourth quadrant, $\cos x = \frac{3}{5}$. Find $\sin x$. \cos^2

11. x is in the fourth quadrant, $\sin x = -\frac{1}{3}$. Find $\cos x$.

12. x is in the second quadrant, $\sin x = \frac{\sqrt{5}}{5}$. Find $\cos x$.

13. z is in the first quadrant, $\sin z = \frac{8}{17}$. Find $\cos z$.

14. z is in the third quadrant, $\sin z = -\frac{3}{4}$. Find $\cos z$.

15. y is in the third quadrant, $\cos y = -\frac{2}{5}$. Find $\sin y$.

16. t is in the first quadrant, $\cos t = \frac{5}{13}$. Find $\sin t$.

17. w is in the fourth quadrant, $\sin w = -\frac{2}{3}$. Find $\cos w$.

18. θ is in the second quadrant, $\cos \theta = -\frac{2}{7}$. Find $\sin \theta$.

Exercise [1.1]

[1] a) II, b) II, c) IV, d) III, e) IV

f) II, g) IV, h) I

[2]

a) $\frac{7\pi}{3}$, $\frac{13\pi}{3}$, $\frac{19\pi}{3}$, $\frac{25\pi}{3}$

b) $\frac{13\pi}{6}$, $\frac{25\pi}{6}$, $\frac{37\pi}{6}$, $\frac{49\pi}{6}$

c) $\frac{11\pi}{4}$, $\frac{19\pi}{4}$, $\frac{27\pi}{4}$, $\frac{35\pi}{4}$

d) $\frac{10\pi}{3}$, $\frac{16\pi}{3}$, $\frac{22\pi}{3}$, $\frac{28\pi}{3}$

e) $\frac{17\pi}{6}$, $\frac{29\pi}{6}$, $\frac{41\pi}{6}$, $\frac{53\pi}{6}$

f) $\frac{9\pi}{4}$, $\frac{17\pi}{4}$, $\frac{25\pi}{4}$, $\frac{33\pi}{4}$

[3] a) $\frac{11\pi}{6}$, b) $\frac{5\pi}{6}$, c) $\frac{7\pi}{6}$

[4] a) $\frac{5\pi}{3}$, b) $\frac{2\pi}{3}$, c) $\frac{4\pi}{3}$

[5] a) $\frac{5\pi}{4}$, b) $\frac{\pi}{4}$, c) $\frac{7\pi}{4}$

[6] a) $\frac{11\pi}{8}$, b) $\frac{3\pi}{8}$, c) $\frac{13\pi}{8}$



[4] ctd

[7] a) $\frac{11\pi}{7}$, b) $\frac{4\pi}{7}$, c) $\frac{10\pi}{7}$

[8] a) $\frac{13\pi}{9}$, b) $\frac{4\pi}{9}$, c) $\frac{14\pi}{9}$

[9] a) $\frac{23\pi}{12}$, b) $\frac{11\pi}{12}$, c) $\frac{13\pi}{12}$

[10] a) $\frac{19\pi}{10}$, b) $\frac{9\pi}{10}$, c) $\frac{11\pi}{10}$

Exercises 1.2

1. a. $(u, -v)$

2. a. $\frac{1}{2}$

3. a. $(-u, -v)$

4. a. $\frac{\sqrt{3}}{2}$

5. a. $(-u, v)$

6. a. $\frac{\sqrt{2}}{2}$

b. u

c. $\frac{\sqrt{3}}{2}$

b. $-u$

c. $\frac{1}{2}$

b. $-u$

c. $\frac{\sqrt{3}}{2}$

c. $-v$

b. $\frac{\sqrt{2}}{2}$

c. $-v$

c. $\frac{\sqrt{2}}{2}$

c. v

a. $\frac{\sqrt{3}}{2}$

Selected answers

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9. $\frac{8}{17}$

11. $\frac{2\sqrt{2}}{3}$

13. $\frac{15}{17}$

15. $\frac{\sqrt{21}}{5}$

17. $\frac{\sqrt{3}}{3}$