trigonometric functions are positive/negative according to the chart:

Quadrant II	Quadrant I
$\sin(x)$ is positive	$\sin(x)$ is positive
$\cos(x)$ is negative	$\cos(x)$ is positive
$\tan(x)$ is negative	$\tan(x)$ is positive
Quadrant III	Quadrant IV
$\sin(x)$ is negative	$\sin(x)$ is negative
$\cos(x)$ is negative	$\cos(x)$ is positive
$\tan(x)$ is positive	$\tan(x)$ is negative

17.3   Exercises

Exercise 17.1

Convert from radian to degree.

a) $\frac{\pi}{4}$ b) $\frac{2\pi}{3}$ c) $\frac{5\pi}{6}$ d) $\frac{7\pi}{4}$ e) $\frac{3\pi}{2}$ f) $\frac{5\pi}{4}$ g) $\frac{13\pi}{6}$ h) $-\frac{5\pi}{3}$

Exercise 17.2

Convert from degree to radian.

a) $120°$ b) $60°$ c) $300°$ d) $135°$

e) $90°$ f) $225°$ g) $480°$ h) $-150°$

Exercise 17.3

Find $\sin(x)$, $\cos(x)$, and $\tan(x)$ for the following angles.

a) $x = 150°$ b) $x = 45°$ c) $x = 210°$ d) $x = 60°$

e) $x = 30°$ f) $x = 300°$ g) $x = 90°$ h) $x = 315°$

i) $x = 225°$ j) $x = 180°$ k) $x = 120°$ l) $x = 270°$

m) $x = 405°$ n) $x = -135°$ o) $x = -240°$ p) $x = 690°$

q) $x = \frac{5\pi}{3}$ r) $x = \frac{\pi}{6}$ s) $x = \frac{4\pi}{3}$ t) $x = \frac{5\pi}{6}$

u) $x = \frac{7\pi}{3}$ v) $x = \frac{7\pi}{4}$ w) $x = -\frac{\pi}{2}$ x) $x = \frac{13\pi}{3}$

Exercise 17.4

Find the trigonometric function values by using the addition and subtraction formulas.

a) $\sin(75°)$ b) $\cos(15°)$ c) $\tan(105°)$ d) $\sin(195°)$

e) $\cos(345°)$ f) $\sin(15°)$ g) $\cos(285°)$ h) $\tan(165°)$

i) $\cos\left(\frac{11\pi}{12}\right)$ j) $\sin\left(\frac{\pi}{12}\right)$ k) $\tan\left(\frac{13\pi}{12}\right)$ l) $\sin\left(\frac{23\pi}{12}\right)$

Exercise 17.5

Find the exact trigonometric function values by using the half-angle formulas.

a) $\cos(22.5°)$ b) $\sin(15°)$ c) $\cos(15°)$ d) $\tan(15°)$

e) $\sin(7.5°)$ f) $\tan(105°)$ g) $\sin\left(\frac{3\pi}{8}\right)$ h) $\cos\left(\frac{11\pi}{12}\right)$

Exercise 17.6

Simplify the function f using the addition and subtraction formulas.

a) $f(x) = \sin\left(x + \frac{\pi}{2}\right)$ b) $f(x) = \cos\left(x - \frac{\pi}{4}\right)$ c) $f(x) = \tan\left(\pi - x\right)$

d) $f(x) = \sin\left(\frac{\pi}{6} - x\right)$ e) $f(x) = \cos\left(\frac{2\pi}{3} - x\right)$ f) $f(x) = \cos\left(x + \frac{11\pi}{12}\right)$