Week 12

Sections 5.2

HW12: 6, 8, 12, 16, 24, 26, 28, 46, 50, 64 (p. 417-418)

Review Exercises
Find the exact value of the trigonometric function at the given real number.   a) $\sin \dfrac{7\pi}{6}$ b) $\cos \dfrac{17\pi}{6}$ c) $\tan \dfrac{7\pi}{6}$ <u>Solution</u>   a) $\sin \dfrac{7\pi}{6} = -\dfrac{1}{2}$ b) $\cos \dfrac{17\pi}{6} = -\dfrac{\sqrt{3}}{2}$ c) $\tan \dfrac{7\pi}{6} = \dfrac{\sqrt{3}}{3}$
Find the exact value of the trigonometric function at the given real number.   a) $\sin \dfrac{11\pi}{4}$ b) $\sin \left(-\dfrac{\pi}{4}\right)$ c) $\sin \dfrac{5\pi}{4}$ <u>Solution</u>   a) $\sin \dfrac{11\pi}{4} = \dfrac{\sqrt{2}}{2}$ b) $\sin \left(-\dfrac{\pi}{4}\right) = -\dfrac{\sqrt{2}}{2}$ c) $\sin \dfrac{5\pi}{4} = -\dfrac{\sqrt{2}}{2}$

Find the exact value of the trigonometric function at the given real number.

a) $\sin \dfrac{7\pi}{3}$

b) $\csc \dfrac{7\pi}{3}$

c) $\cot \dfrac{7\pi}{3}$

Solution

a) $\sin \dfrac{7\pi}{3} = \dfrac{\sqrt{3}}{2}$

b) $\csc \dfrac{7\pi}{3} = \dfrac{2\sqrt{3}}{3}$

c) $\cot \dfrac{7\pi}{3} = \dfrac{\sqrt{3}}{3}$

Find the exact value of the trigonometric function at the given real number.

a) $\cos\left(-\dfrac{\pi}{6}\right)$

b) $\csc\left(-\dfrac{\pi}{3}\right)$

c) $\tan\left(-\dfrac{\pi}{6}\right)$

Solution

a) $\cos\left(-\dfrac{\pi}{6}\right) = \dfrac{\sqrt{3}}{2}$

b) $\csc\left(-\dfrac{\pi}{3}\right) = -\dfrac{2\sqrt{3}}{3}$

c) $\tan\left(-\dfrac{\pi}{6}\right) = -\dfrac{\sqrt{3}}{3}$

Find the value of each of six trigonometric functions (if it's defined) at the given real number t. Use your answer to complete the table.

$$t = 0$$

Solution

t	$\sin t$	$\cos t$	$\tan t$	$\csc t$	$\sec t$	$\cot t$
0	0	1	0	$undefined$	1	$undefined$

Find the value of each of six trigonometric functions (if it's defined) at the given real number t. Use your answer to complete the table.

$$t = \pi$$

Solution

t	$\sin t$	$\cos t$	$\tan t$	$\csc t$	$\sec t$	$\cot t$
π	0	-1	0	$undefined$	-1	$undefined$

The terminal point $P(x, y)$ determined by a real number t is given. Find $\sin t$, $\cos t$, and $\tan t$.

$$\left(-\frac{3}{5}, -\frac{4}{5}\right)$$

Solution

$$\sin t = -\frac{4}{5}$$

$$\cos t = -\frac{3}{5}$$

$$\tan t = \frac{-\,^4/_5}{-\,^3/_5} = \frac{4}{3}$$

Find the sign of the expression if the terminal point determined by t is in the given quadrant.
$$\sin t \, \cos t, \quad quadrant \; II$$

Solution

In quadrant II, $\sin t$ is positive, and $\cos t$ is negative, therefore, their product is negative.

From the information given, find the quadrant in which the terminal point determined by t lies.
$$\sin t > 0 \text{ and } \cos t < 0$$

Solution

Quadrant II

Find the values of the trigonometric functions of t from the given information.

$$\sin t = -\frac{4}{5}, \text{terminal point of } t \text{ is in quadrant IV}$$

<u>Solution</u>

The terminal point determined by t is $P\left(x, -\frac{4}{5}\right)$.

Since P is on the unit circle, $x^2 + \left(-\frac{4}{5}\right)^2 = 1$.

Solve for x.

$$x^2 = 1 - \left(-\frac{4}{5}\right)^2$$

$$x^2 = 1 - \frac{16}{25}$$

$$x^2 = \frac{9}{25}$$

$$x = \pm\frac{3}{5}$$

Since the terminal point is in quadrant IV, $x = \frac{3}{5}$. Thus, the terminal point is $P\left(\frac{3}{5}, -\frac{4}{5}\right)$.

Thus, $\cos t = \frac{3}{5}, \sin t = -\frac{4}{5}, \tan t = -\frac{4}{3}, \csc t = -\frac{5}{4}, \sec t = \frac{5}{3}, \cot t = -\frac{3}{4}$.