

1. Find each of the following values.

(a)  $\csc \frac{4\pi}{3}$

(b)  $\cos \pi$

(c)  $\tan \frac{11\pi}{6}$

(d)  $\tan \frac{3\pi}{2}$

2. Find the values of all six trigonometric functions at  $\theta = -\frac{3\pi}{4}$ . *Completely simplify all values.*

3. Solve each of the following equations for  $\theta$  in the interval  $[0, 2\pi]$ .

(a)  $\sec 3\theta = \sqrt{2}$

(b)  $4\cos \theta - 3\sec \theta = 0$

(c)  $\tan^2 \frac{\theta}{2} - 3 = 0$

(d)  $2\sin^2 \theta - \cos \theta - 1 = 0$

4. Given  $\cos \theta = -\frac{1}{3}$  and  $\pi \leq \theta \leq \frac{3\pi}{2}$ , find the values of the other five trigonometric functions.

5. Given  $\csc \theta = -\frac{13}{12}$  and  $\frac{3\pi}{2} \leq \theta \leq 2\pi$ , find the values of the other five trigonometric functions.

## Answers

1. (a)  $-\frac{2\sqrt{3}}{3}$   
(b)  $-1$   
(c)  $-\frac{\sqrt{3}}{3}$   
(d) undefined

2.

$$\sin \theta = -\frac{\sqrt{2}}{2}, \quad \cos \theta = -\frac{\sqrt{2}}{2}, \quad \tan \theta = 1$$

$$\csc \theta = -\sqrt{2}, \quad \sec \theta = -\sqrt{2}, \quad \cot \theta = 1$$

3. (a)  $\theta = \frac{\pi}{12}, \frac{7\pi}{12}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{17\pi}{12}, \frac{23\pi}{12}$   
(b)  $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$   
(c)  $\theta = \frac{2\pi}{3}, \frac{4\pi}{3}$   
(d)  $\theta = \frac{\pi}{3}, \pi, \frac{5\pi}{3}$

4.

$$\sin \theta = -\frac{2\sqrt{2}}{3}, \quad \cos \theta = -\frac{1}{3}, \quad \tan \theta = 2\sqrt{2}$$

$$\csc \theta = -\frac{3\sqrt{2}}{4}, \quad \sec \theta = -3, \quad \cot \theta = \frac{\sqrt{2}}{4}$$

5.

$$\sin \theta = -\frac{12}{13}, \quad \cos \theta = \frac{5}{13}, \quad \tan \theta = -\frac{12}{5}$$

$$\csc \theta = -\frac{13}{12}, \quad \sec \theta = \frac{13}{5}, \quad \cot \theta = -\frac{5}{12}$$