

Solve each equation over the interval $[0^\circ, 360^\circ)$. If necessary, round answers to the nearest hundredths.

1.) $2\cos x + \sqrt{3} = 0$

$2\cos x = -\sqrt{3}$

$\cos x = -\frac{\sqrt{3}}{2}$

$150^\circ, 210^\circ$

2.) $9\sin^2 x - 6\sin x + 1 = 0$

$(3\sin x - 1)(3\sin x - 1)$

$\sin x = \frac{1}{3}$

19.47°
 160.53°

3.) $6\cos^2 x + 5\cos x + 1 = 0$

$(2\cos x + 1)(3\cos x + 1)$

$\cos x = -\frac{1}{2} \quad \cos x = -\frac{1}{3}$

$120^\circ, 240^\circ, 109.47^\circ, 250.53^\circ$

4.) $2\cot^2 x - 5 = 1$

$2\cot^2 x = 6$

$\cot^2 x = 3$

$\cot x = \pm\sqrt{3}$

$\tan x = \pm\frac{1}{\sqrt{3}}$

$30^\circ, 150^\circ, 210^\circ, 330^\circ$

5.) $\sin^2 x - 5\sin x + 6 = 0$

$(\sin x - 3)(\sin x - 2) = 0$

$\sin x = 3 \quad \sin x = 2$

 \emptyset \emptyset

no solution

6.) $2\tan^2 x = 4\tan x$

$2\tan^2 x - 4\tan x = 0$

$2\tan x (\tan x - 2) = 0$

$\tan x = 0$

$\tan x = 2$

$0^\circ, 180^\circ$ $63.43^\circ, 243.43^\circ$

Solve each equation over the interval $[0, 2\pi)$. If necessary, round answers to the nearest hundredths.

7.) $3 \tan^2 x = 1$

$$\tan^2 x = \frac{1}{3}$$

$$\tan x = \pm \frac{1}{\sqrt{3}}$$

$$\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$$

8.) $\sin x(2 \sin x - 5) = 0$

$$\sin x = 0 \quad \sin x = \frac{5}{2}$$

$$0, \pi$$

\emptyset

9.) $3 \cos^2 x + 5 \cos x = 2$

$$(3 \cos x - 1)(\cos x + 2) = 0$$

$$\cos x = \frac{1}{3} \quad \cos x = -2$$

$$1.23, 5.05$$

\emptyset

10.) $2 \csc x + 1 = \csc x + 3$

$$\csc x = 2$$

$$\sin x = \frac{1}{2}$$

$$\frac{\pi}{6}, \frac{5\pi}{6}$$

11.) $\sec^2 x - 5 \sec x - 14 = 0$

$$(\sec x - 7)(\sec x + 2) = 0$$

$$\sec x = 7 \quad \sec x = -2$$

$$\cos x = \frac{1}{7} \quad \cos x = -\frac{1}{2}$$

$$1.43, 4.85, \frac{2\pi}{3}, \frac{4\pi}{3}$$

12.) $\cot x \tan x = \cot x$

$$\cot x \tan x - \cot x = 0$$

$$\cot x (\tan x - 1) = 0$$

$$\cot x = 0 \quad \tan x = 1$$

$$\text{or} \quad \tan x = \frac{1}{0}$$

$$\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{4}, \frac{5\pi}{4}$$