

College Algebra

Unit 6 LT 2 Practice Day 2

Solve each equation for exact solutions over the interval of $[0^\circ, 360^\circ)$. If necessary, round answers to the nearest ~~tenths~~ hundredths

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Date _____ Period _____

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

$$\begin{aligned} \tan^2 x - \tan x &= 0 \\ \tan x (\tan x - 1) &= 0 \\ \tan x = 0 \quad \tan x &= 1 \end{aligned}$$

$$X = 0^\circ, 180^\circ, 45^\circ, 225^\circ$$

2.) $\csc^2 x - 2 = -\csc x$

$$\begin{aligned} \csc^2 x + \csc x - 2 &= 0 \\ (\csc x + 2)(\csc x - 1) &= 0 \\ \csc x = -2 \quad \csc x &= 1 \\ \sin x = -\frac{1}{2} \quad \sin x &= 1 \end{aligned}$$

$$\begin{array}{r} -2 \\ 2 \times -1 \\ \hline 1 \end{array}$$

$$X = 210^\circ, 330^\circ, 90^\circ$$

3.) $\cot^2 x + 4 = 7$

$$\begin{aligned} \sqrt{\cot^2 x} &= \sqrt{3} \\ \cot x &= \pm\sqrt{3} \end{aligned}$$

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

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

4.) $\cos x - 4 = 3 \cos x$

$$\begin{aligned} -4 &= 2 \cos x \\ -2 &= \cos x \end{aligned}$$

$$\text{DNE}$$

5.) $\sec^2 x - 7 \sec x = -12$

$$\sec^2 x - 7 \sec x + 12 = 0$$

$$\begin{array}{r} 12 \\ -4 \times -3 \\ \hline -7 \end{array} \quad (\sec x - 4)(\sec x - 3) = 0$$

$$\sec x = 4 \quad \sec x = 3$$

$$\cos x = \frac{1}{4} \quad \cos x = \frac{1}{3}$$

6.) $(2 \sin x - 7)(\tan x + 1) = 0$

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

$$\text{DNE}$$

$$X = 135^\circ, 315^\circ$$

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

7.) $4\cos^2 x - 1 = 0$

$$\sqrt{\cos^2 x} = \sqrt{\frac{1}{4}}$$

$$\cos x = \pm \frac{1}{2}$$

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

8.) $2\cot^2 x + 6 = 13\cot x$

$$2\cot^2 x - 13\cot x + 6 = 0$$

$$(2\cot x - 1)(\cot x - 6) = 0$$

$$\cot x = \frac{1}{2} \quad \cot x = 6$$

$$\tan x = 2 \quad \tan x = \frac{1}{6}$$

$$x = 1.11, 4.25, .17, 3.31$$

9.) $2\cos x \tan x - \tan x = 0$

$$\tan x (2\cos x - 1) = 0$$

$$\tan x = 0 \quad \cos x = \frac{1}{2}$$

$$x = 0, \frac{\pi}{2}, \frac{\pi}{3}, \frac{5\pi}{3}$$

10.) $\sec x \csc x + \sqrt{2} \csc x = 0$

$$\csc x (\sec x + \sqrt{2}) = 0$$

$$\csc x = 0 \quad \sec x = -\sqrt{2}$$

DNE

$$\cos x = -\frac{1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$$

$$x = \frac{3\pi}{4}, \frac{5\pi}{4}$$

11.) $\frac{1}{2}\tan^2 x = 2$

$$\tan^2 x = 4$$

$$\tan x = \pm 2$$

$$x = 1.11, 2.03, 4.25, 5.17$$

12.) $3\csc^2 x - 2 = 4$

$$3\csc^2 x = 6$$

$$\csc^2 x = 2$$

$$\csc x = \pm\sqrt{2}$$

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

$$x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$$