

Math 4 U4 L2 II Solving Trig Equations

"C"

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

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

$$\textcircled{2} \csc x = 2$$

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

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

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

$$\textcircled{3} 2 \sin x = 6$$

$$\sin x = 3$$

No solutions

$$\textcircled{4} \sin x = \frac{\sqrt{3}}{2}$$

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

$$\textcircled{5} \tan x = \frac{1}{\sqrt{3}}$$

$$\frac{\sin x}{\cos x} = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{1}{\sqrt{3}}$$

$$x = \frac{\pi}{6}, \frac{7\pi}{6}$$

"B"

$$\textcircled{6} \sin x + \sin x \cdot \cot x = 0$$

$$\sin x (1 + \cot x) = 0$$

$$\sin x = 0 \quad \left| \quad 1 + \cot x = 0 \right.$$

$$x = 0, \pi, 2\pi \quad \left| \quad \cot x = -1 \right.$$

$$\tan x = -1$$

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

$$\textcircled{7} 2 \cos^2 x - 3 \cos x + 1 = 0$$

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

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

$$\cos x = 1$$

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

$$x = 0, 2\pi$$

$$\textcircled{8} 4 \sin^2 x = 1$$

$$\sin^2 x = \frac{1}{4}$$

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

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



$$\textcircled{9} \tan^2 x \cdot \sin x = -\sin x$$

$$\tan^2 x \cdot \sin x + \sin x = 0$$

$$\sin x (\tan^2 x + 1) = 0$$

$$\sin x = 0 \quad \left\{ \begin{array}{l} \tan^2 x + 1 = 0 \\ \tan^2 x = -1 \\ \text{No solution} \end{array} \right.$$

$$x = 0, \pi, 2\pi$$

$$\textcircled{10} \csc x = \sin^2 x \cdot \csc x$$

$$\csc x - \sin^2 x \cdot \csc x = 0$$

$$\csc x (1 - \sin^2 x) = 0$$

$$\csc x = 0 \quad \left\{ \begin{array}{l} 1 - \sin^2 x = 0 \\ \cos^2 x = 0 \\ x = \frac{\pi}{2}, \frac{3\pi}{2} \end{array} \right.$$

$$\text{No solution}$$

$$\textcircled{11} 2 \sin \left(x + \frac{\pi}{6} \right) = 1$$

$$\sin \left(x + \frac{\pi}{6} \right) = \frac{1}{2}$$

$$x + \frac{\pi}{6} = \frac{\pi}{6} \quad \left\{ \begin{array}{l} x + \frac{\pi}{6} = \frac{5\pi}{6} \\ x = 0 \\ x = \frac{2\pi}{3} \end{array} \right.$$

$$x = 0$$

"A"

$$\textcircled{12} -2 \sin^2 x - 5 \cos x + 4 = 0$$

$$-2(1 - \cos^2 x) - 5 \cos x + 4 = 0$$

$$-2 + 2 \cos^2 x - 5 \cos x + 4 = 0$$

$$2 \cos^2 x - 5 \cos x + 2 = 0$$

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

$$\cos x = \frac{1}{2} \quad \left\{ \begin{array}{l} \cos x = 2 \\ \text{No solution} \end{array} \right.$$

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

$$\textcircled{13} 2 \cos^2 x + \sin x - 1 = 0$$

$$2(1 - \sin^2 x) + \sin x - 1 = 0$$

$$2 - 2 \sin^2 x + \sin x - 1 = 0$$

$$-2 \sin^2 x + \sin x + 1 = 0$$

$$(-2 \sin x - 1)(\sin x - 1) = 0$$

$$\sin x = -\frac{1}{2} \quad \left\{ \begin{array}{l} \sin x = 1 \\ x = \frac{\pi}{6} \end{array} \right.$$

$$x = \frac{7\pi}{6}, \frac{11\pi}{6}$$

$$\textcircled{14} \tan^2 x + \sec x - 1 = 0$$

$$\sec^2 x - 1 + \sec x - 1 = 0$$

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

$$(\sec x + 2)(\sec x - 1) = 0$$

$$\sec x = -2$$

$$\sec x = 1$$

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

$$\cos x = 1$$

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

$$x = 0, 2\pi$$