

Solving More Trig Equations WS

1) $3x^2 + 5x = 0$

$$x(3x + 5) = 0$$

$$x = 0 \quad x = -5/3$$

2) $x^2 - 3x - 28 = 0$

$$(x - 7)(x + 4) = 0$$

$$x = 7 \quad x = -4$$

3) $2x^2 + 3x - 5 = 0$

$$(2x + 5)(x - 1) = 0$$

$$x = -5/2 \quad x = 1$$

4) $8x^2 - 6x = 0$

$$2x(4x - 3) = 0$$

$$x = 0 \quad x = 3/4$$

5) $2x^2 + 7x + 6 = 0$

$$(2x + 3)(x + 2) = 0$$

$$x = -3/2 \quad x = -2$$

6) $3x^2 - 13x + 4 = 0$

$$(3x - 1)(x - 4) = 0$$

$$x = 1/3 \quad x = 4$$

7) $\cos^2 x = \frac{1}{2}$

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

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

8) $2 \sin x = \sqrt{3}$

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

$$x = \pi/3, 2\pi/3$$

9) $3 \sin^2 x = \cos^2 x$

$$3 \sin^2 x = 1 - \sin^2 x$$

$$4 \sin^2 x = 1$$

$$\sin^2 x = 1/4$$

$$\sin x = \pm 1/2$$

$$x = \pi/6, 5\pi/6, 7\pi/6, 11\pi/6$$

10) $\sin x = \sin(-x) + 1$

$$\sin x = -\sin x + 1$$

$$2 \sin x = 1$$

$$\sin x = 1/2$$

$$x = \pi/6, 5\pi/6$$

11) $4 \cos x \sin^2 x - \cos x = 0$

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

$$\cos x = 0 \quad \sin^2 x = 1/4$$

$$\sin x = \pm 1/2$$

$$x = \frac{\pi}{2}, \frac{3\pi}{2}, \pi/6, 5\pi/6, 7\pi/6, 11\pi/6$$

12) $\cot^2 x - \sqrt{3} \cot x = 0$

$$\cot x (\cot x - \sqrt{3}) = 0$$

$$\cot x = 0 \quad \cot x = \sqrt{3}$$

$$x = \pi/2, 3\pi/2, \pi/6, 7\pi/6$$

$$13) \quad 2\cos^2 x - \cos x - 1 = 0$$

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

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

$$x = 2\pi/3, 4\pi/3, 0$$

$$14) \quad \sin^2 x = 2\cos x + 2$$

$$1 - \cos^2 x = 2\cos x + 2$$

$$0 = \cos^2 x + 2\cos x + 1$$

$$(\cos x + 1)(\cos x + 1) = 0$$

$$\cos x = -1 \rightarrow x = \pi$$

$$15) \quad \sec^2 x = \tan x + 1$$

$$\tan^2 x + 1 = \tan x + 1$$

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

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

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

$$x = 0, \pi, \pi/4, 5\pi/4$$

$$16) \quad 3\cos x + 3 = 2(1 - \cos^2 x)$$

$$3\cos x + 3 = 2 - 2\cos^2 x$$

$$2\cos^2 x + 3\cos x + 1 = 0$$

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

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

$$x = 2\pi/3, 4\pi/3, \pi$$

$$17) \quad \csc^2 x - 1 + \csc^2 x = 3$$

$$2\csc^2 x = 4$$

$$\csc^2 x = 2$$

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

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

$$x = \pi/4, 3\pi/4, 5\pi/4, 7\pi/4$$

$$18) \quad 2(1 - \cos^2 x) = 3 - 3\cos x$$

$$2 - 2\cos^2 x = 3 - 3\cos x$$

$$0 = 2\cos^2 x - 3\cos x + 1$$

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

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

$$x = \pi/3, 5\pi/3, 0$$

$$19) \quad 3(\sec^2 x - 1) + 4\sec x = -4$$

$$3\sec^2 x + 4\sec x + 1 = 0$$

$$(3\sec x + 1)(\sec x + 1) = 0$$

$$\sec x = -\frac{1}{3} \quad \sec x = -1$$

$$\cos x = -3 \quad \cos x = -1$$

$$N/A \quad x = \pi$$

$$20) \quad \tan^2 x + 1 = 2\tan x$$

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

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

$$\tan x = 1$$

$$x = \pi/4, 5\pi/4$$

$$21) \quad 2\cos x = -\sqrt{2}$$

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

$$x = 3\pi/4, 5\pi/4$$

$$22) \quad 2\cos x \csc x - \sqrt{3} \csc x$$

$$\csc x (2\cos x - \sqrt{3}) = 0$$

$$\csc x = 0 \quad \cos x = \frac{\sqrt{3}}{2}$$

$$\sin x = \text{undefined}$$

$$N/A \quad x = \pi/6, 11\pi/6$$