

Solving Trig Equations WS II

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

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

$$\sin x = 0 \quad \sin x = -\frac{1}{2}$$

$$x = 0, \pi, \frac{7\pi}{6}, \frac{11\pi}{6}$$

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

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

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

$$x = 0, \pi, \frac{\pi}{3}, \frac{4\pi}{3}$$

$$3) \sin x + \sin x \cos x = 0$$

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

$$\sin x = 0 \quad \cos x = -1$$

$$x = 0, \pi$$

$$4) \sin^2 x - 3\sin x + 2 = 0$$

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

$$\sin x = 1 \quad \sin x = 2$$

$$x = \frac{\pi}{2} \quad \text{N/A}$$

$$5) \cos x = 3\cos x - 2$$

$$-2\cos x = -2$$

$$\cos x = 1$$

$$x = 0$$

$$6) \cos x = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

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

$$7) \sin^2 x - 2\sin x - 3 = 0$$

$$(\sin x - 3)(\sin x + 1) = 0$$

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

$$\text{N/A} \quad x = \frac{3\pi}{2}$$

$$8) \sec x = -\frac{2\sqrt{3}}{3}$$

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

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

$$9) 3\tan^2 x - \sqrt{3} \tan x = 0$$

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

$$\tan x = 0 \quad \tan x = \frac{\sqrt{3}}{3} = \frac{1}{\sqrt{3}}$$

$$x = 0, \pi \quad x = \frac{\pi}{6}, \frac{7\pi}{6}$$

$$10) (\cos^2 x - 1)(\csc x + 1) = 0$$

$$\cos^2 x = 1 \quad \csc x = -1$$

$$\cos x = \pm 1 \quad \sin x = -1$$

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

$$11) \sin x \tan x - \tan x = 0$$

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

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

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

$$12) 2\cos^2 x - 5\cos x + 2 = 0$$

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

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

$$x = \frac{\pi}{3}, \frac{5\pi}{3} \quad \text{N/A}$$

makes $\tan x$
undefined!

$$13) (\tan x - 1)(\sec x - 1) = 0$$

$$\tan x = 1 \quad \sec x = 1$$

$$\cos x = 1$$

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

$$14) \cos x - 2\cos x \sin x = 0$$

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

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

$$x = \pi/2, 3\pi/2, \pi/6, 5\pi/6$$

$$15) 4\cos^2 x - 4\cos x + 1 = 0$$

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

$$\cos x = 1/2$$

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

$$16) 2\tan x \cos x + \tan x = 0$$

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

$$\tan x = 0 \quad \cos x = -1/2$$

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

$$17) 9\tan^2 x - 3 = 0$$

$$\tan^2 x = 1/3$$

$$\tan x = \pm \frac{1}{\sqrt{3}} \quad \leftarrow \sin x = 1/2$$

$$\sqrt{3} \quad \leftarrow \cos x = \sqrt{3}/2$$

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