

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

a) $x = \frac{\pi}{3}$

$$2 \cos \frac{\pi}{3} - 1 = 0$$

$$2\left(\frac{1}{2}\right) - 1 = 0$$

$$1 - 1 = 0$$

$$0 = 0 \checkmark$$

b) $x = \frac{5\pi}{3}$

$$2 \cos\left(\frac{5\pi}{3}\right) - 1 = 0$$

$$2\left(\frac{1}{2}\right) - 1 = 0$$

$$1 - 1 = 0$$

$$0 = 0 \checkmark$$

2) $\csc x - 2 = 0$

a) $x = \frac{\pi}{6}$

$$\frac{1}{\sin}\left(\frac{\pi}{6}\right) - 2 = 0$$

$$2 - 2 = 0$$

$$0 = 0 \checkmark$$

b) $x = \frac{5\pi}{6}$

$$\csc\left(\frac{5\pi}{6}\right) - 2 = 0$$

$$2 - 2 = 0$$

$$0 = 0 \checkmark$$

3) $3 \tan^2 2x - 1 = 0$

a) $x = \frac{\pi}{12}$

$$3\left(\tan\left(\frac{2\pi}{12}\right)\right)^2 - 1 = 0$$

$$3\left(\tan^2 \frac{\pi}{6}\right) - 1 = 0$$

$$3\left(\frac{1}{\sqrt{3}}\right)^2 - 1 = 0$$

$$3\left(\frac{1}{3}\right) - 1 = 0$$

$$1 - 1 = 0$$

$$0 = 0 \checkmark$$

b) $x = \frac{5\pi}{12}$

$$3\left(\tan\left(\frac{10\pi}{12}\right)\right)^2 - 1 = 0$$

$$3\left(\tan^2 \frac{5\pi}{6}\right) - 1 = 0$$

$$3\left(-\frac{1}{\sqrt{3}}\right)^2 - 1 = 0$$

$$3\left(\frac{1}{3}\right) - 1 = 0$$

$$1 - 1 = 0$$

$$0 = 0 \checkmark$$

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

a) $x = \frac{\pi}{8}$

$$4\left[\cos\left(\frac{\pi}{4}\right)\right]^2 - 2 = 0$$

$$4\left[\cos^2 \frac{\pi}{4}\right] - 2 = 0$$

$$4\left(\frac{\sqrt{2}}{2}\right)^2 - 2 = 0$$

$$4\left(\frac{2}{4}\right) - 2 = 0$$

$$2 - 2 = 0$$

$$0 = 0 \checkmark$$

b) $x = \frac{7\pi}{8}$

$$4\left[\cos\left(\frac{7\pi}{4}\right)\right]^2 - 2 = 0$$

$$4\left[\cos^2 \frac{7\pi}{4}\right] - 2 = 0$$

$$4\left[\left(\frac{\sqrt{2}}{2}\right)^2\right] - 2 = 0$$

$$4\left[\frac{2}{4}\right] - 2 = 0$$

$$2 - 2 = 0$$

$$0 = 0 \checkmark$$

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

a) $x = \frac{4\pi}{3}$

$$2 \cos^2\left(\frac{4\pi}{3}\right) + 3 \cos\left(\frac{4\pi}{3}\right) + 1 = 0$$

$$2\left(-\frac{1}{2}\right)^2 + 3\left(-\frac{1}{2}\right) + 1 = 0$$

$$2\left(\frac{1}{4}\right) - \frac{3}{2} + 1 = 0$$

$$\frac{1}{2} - \frac{3}{2} + \frac{2}{2} = 0$$

b) $x = \pi$

$$2 \cos^2(\pi) + 3 \cos(\pi) + 1 = 0$$

$$2(-1)^2 + 3(-1) + 1 = 0$$

$$2 - 3 + 1 = 0$$

$$0 = 0 \checkmark$$

#6) $\sec^4 x - 3\sec^2 x - 4 = 0$

$\cos \frac{5\pi}{3} = \frac{1}{2}$ $\sec \frac{5\pi}{3} = 2$

a) $x = \frac{2\pi}{3}$
 $\sec^4\left(\frac{2\pi}{3}\right) - 3(\sec^2\left(\frac{2\pi}{3}\right)) - 4 = 0$

b) $x = \frac{5\pi}{3}$
 $\sec^4\left(\frac{5\pi}{3}\right) - 3(\sec^2\left(\frac{5\pi}{3}\right)) - 4 = 0$

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

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

$16 - 3(4) - 4 = 0$

$16 - 12 - 4 = 0$

$16 - 12 - 4 = 0$

$0 = 0 \checkmark$

$0 = 0 \checkmark$

#11) $2\cos x + 1 = 0$

$2\cos x = -1$

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

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

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

#12) $\sqrt{2}\sin x + 1 = 0$

$\sqrt{2}\sin x = -1$

$\sin x = \frac{-1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

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

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

#13) $\sqrt{3}\sec x - 2 = 0$

$\sqrt{3}\sec x = 2$

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

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

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

#14) $\cot x + 1 = 0$

$\cot x = -1$

$\tan x = -1$

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

$\cos x = \frac{\sqrt{3}}{2}$
 $\sec = \frac{\pi}{6}, \frac{11\pi}{6}$