

Solve by **Squaring**

$$9) (\tan x + \sqrt{3})^2 = (\sec x)^2$$

$$\tan^2 x + 2\sqrt{3}\tan x + 3 = \sec^2 x$$

$$\tan^2 x + 2\sqrt{3}\tan x + 3 = 1 + \tan^2 x$$

$$2\sqrt{3}\tan x + 3 = 1$$

$$2\sqrt{3}\tan x = -2$$

$$\sqrt{3}\tan x = -1$$

$$\tan x = -\frac{1}{\sqrt{3}}$$

$$\tan x = -\frac{\sqrt{3}}{3}$$

$$x = 150^\circ, 330^\circ$$

!!!Must Check Solutions in Original!!!



Solve by using **Identities**

* * * (must also be checked) * * *

$$10) \cos x = -\cos 2x$$

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

$$\downarrow$$

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

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

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

$$\cos x = \frac{1}{2} \quad \cos x = -2 \quad \emptyset \text{ for cos values greater than } -1$$

$$x = 60^\circ, 300^\circ$$

Solving Trigonometric Equations

For

All SolutionsThere are solutions outside $0^\circ \leq x < 360^\circ$

Solve for all solutions:

11) $2\cos^2 x - 1 = \sin x$

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

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

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

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

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

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

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

$$x = 30^\circ, 150^\circ, 270^\circ$$

$$x = 30^\circ + 360^\circ k, 150^\circ + 360^\circ k, 270^\circ + 360^\circ k$$

Add multiples (k)
of 360° to account
for all angles
coterminal to
these

12) Solve for all solutions:

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

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

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

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

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

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

$$x = 180^\circ$$

$$x = 60^\circ, 300^\circ$$

$$x = 60^\circ + 360^\circ k$$

$$x = 300^\circ + 360^\circ k$$

$$x = 180^\circ + 360^\circ k$$

$$13) \sin x \cot x = \cos^2 x$$

$$\frac{\sin x \cdot \cos x}{\sin x} = \cos^2 x$$

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

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

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

$$x = 90^\circ, 270^\circ \quad x = 0^\circ$$

$$x = 90^\circ + 180^\circ k \quad x = 0^\circ + 360^\circ k$$