

1. $\sin^{-1}\left(\frac{1}{2}\right)$

2. $\cos^{-1}\left(\frac{1}{2}\right)$

3. $\tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$

4. $\arccos\left(-\frac{\sqrt{3}}{2}\right)$

5. $\arcsin\left(\frac{\sqrt{2}}{2}\right)$

6. $\arctan(1)$

7. $\sin^{-1}\left(-\frac{1}{2}\right)$

8. $\cos^{-1}\left(-\frac{1}{2}\right)$

9. $\arctan\left(-\frac{1}{\sqrt{3}}\right)$

10. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

11. $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$

12. $\tan^{-1}(-1)$

13. $\sin^{-1} 0$

14. $\cos^{-1} 0$

15. $\tan^{-1}(-\sqrt{3})$

16. Write a general form solution in both radians and degrees for the equation $\sec x = -2$

If $\sec x = -2$

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

$\cos^{-1}(-\frac{1}{2}) = \frac{2\pi}{3}$ or 120°

Radian form

$\frac{2\pi}{3} + 2\pi k$

Degree form

$120^\circ + 360^\circ k$

17. Write a general form solution for both radians and degrees for the equation $-3 \cot x = \sqrt{3}$

If $-3 \cot x = \sqrt{3}$

then $\cot x = -\frac{\sqrt{3}}{3}$

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

$\tan^{-1}(-\frac{3}{\sqrt{3}}) = -\frac{\pi}{3}$

If using a calculator, remember domain restrictions. You must add π (180°) to angle.

SOLUTION:

$-\frac{\pi}{3} + \pi = \frac{2\pi}{3}$

Radian form

$\frac{2\pi}{3} + \pi k$

Degree form: $120^\circ + 180^\circ k$

Find solutions in radians SHOW ALL WORK!

18. $2\cos\theta + 1 = 0$

$$2\cos\theta = -1$$

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

$$\cos^{-1}(-\frac{1}{2}) = \frac{2\pi}{3}$$

20. $\sqrt{3}\csc\left(3x - \frac{\pi}{2}\right) - 2 = 0$

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

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

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

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

SET SOLUTION
EQUAL to $3x - \frac{\pi}{2}$

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

$$3x = \frac{5\pi}{6}$$

$$x = \frac{5\pi}{18}$$

22. $\tan 3x + \sqrt{3} = 0$

DIVIDE SOLUTION
BY 3

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

$$\tan^{-1}(-\sqrt{3}) = -\frac{\pi}{3} \cdot 3 = -\frac{\pi}{9}$$

24. $4\cos^2\left(\frac{1}{2}x\right) - 1 = 0$ MULTIPLY SOLUTIONS
BY 2

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

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

$$\cos x = \pm\sqrt{\frac{1}{4}} = \pm\frac{1}{2}$$

$$\cos^{-1}\left(\frac{1}{2}\right) = \frac{\pi}{3} \cdot 2 = \boxed{\frac{2\pi}{3}}$$

$$\cos^{-1}\left(-\frac{1}{2}\right) = \frac{2\pi}{3} \cdot 2 = \boxed{\frac{4\pi}{3}}$$

26. $\cos^3 x = \cos x$

$$\cos^3 x - \cos x = 0$$

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

$$\cos x = 0$$

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

$$\cos^2 x = 1$$

$$\cos x = \pm 1$$

$$x = \boxed{0}, x = \boxed{\pi}$$

19. $3\tan^3\left(x - \frac{\pi}{8}\right) = \tan\left(x - \frac{\pi}{8}\right)$

3 solutions! $\frac{\text{GCF}}{3 + \tan^2 x} = \tan x$

$$3\tan^3 x - \tan x = 0$$

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

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

$$\tan^{-1}(0) = 0 \quad 3\tan^2 x = 1$$

$$+ \frac{\pi}{8} = \boxed{\frac{\pi}{8}} \quad \tan x = \pm\sqrt{\frac{1}{3}}$$

$$\begin{array}{|c|} \hline \frac{\pi}{6} + \frac{\pi}{8} \\ \hline \boxed{\frac{7\pi}{24}} \\ \hline \end{array}$$

$$\begin{array}{|c|} \hline -\frac{\pi}{6} + \frac{\pi}{8} \\ \hline \boxed{\frac{-\pi}{24}} \\ \hline \end{array}$$

MULTIPLY SOLUTIONS. $\sec^2\left(\frac{\theta}{4}\right) - \sec\left(\frac{\theta}{4}\right) = 2$

BY 4

$$\sec^2 \theta - \sec \theta = 2$$

$$\sec^2 \theta - \sec \theta - 2 = 0$$

$$\sec \theta = 2, \sec \theta = 1$$

$$\cos \theta = \frac{1}{2}, \cos \theta = -1$$

$$\theta = \frac{\pi}{3} \cdot 4 = \boxed{\frac{4\pi}{3}} \quad \theta = \pi \cdot 4 = \boxed{4\pi}$$

23. $2\cos^2 x + \cos x - 1 = 0$

$$\cos \theta = -1, \cos \theta = \frac{1}{2}$$

$$\theta = \boxed{\pi}, \theta = \boxed{\frac{\pi}{3}}$$

25. $2\sin^2 \theta + 3\sin \theta + 1 = 0$

$$\sin \theta = -1, \sin \theta = -\frac{1}{2}$$

$$\theta = \boxed{-\frac{\pi}{2}}, \theta = \boxed{-\frac{\pi}{6}}$$

$$\begin{array}{|c|} \hline 2 \\ \hline \cancel{2} \\ \hline -1 \\ \hline \cancel{1} \\ \hline \frac{1}{2} \\ \hline -\frac{1}{2} \\ \hline \end{array}$$

DIVIDE SOLUTIONS
BY 2

27. $\cos 2\theta = \sqrt{2} - \cos 2\theta$

$$2\cos 2\theta = \sqrt{2}$$

$$\cos 2\theta = \frac{\sqrt{2}}{2}$$

$$\cos^{-1}\left(\frac{\sqrt{2}}{2}\right) = \frac{\pi}{4} \cdot 2 = \boxed{\frac{\pi}{8}}$$

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6. Arctan (1)

7. $\sin^{-1}\left(-\frac{1}{2}\right)$

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16. Write a **general form** solution in both radians and degrees for the equation $\sec x = -2$ 17. Write a **general form** solution for both radians and degrees for the equation $-3 \cot x = \sqrt{3}$

Find solutions in radians SHOW ALL WORK!

$$18. \quad 2\cos\theta + 1 = 0$$

$$19. \quad 3\tan^3\left(x - \frac{\pi}{8}\right) = \tan\left(x - \frac{\pi}{8}\right)$$

$$20. \quad \sqrt{3}\csc\left(3x - \frac{\pi}{2}\right) - 2 = 0$$

$$21. \quad \sec^2\left(\frac{\theta}{4}\right) - \sec\left(\frac{\theta}{4}\right) = 2$$

$$22. \quad \tan 3x + \sqrt{3} = 0$$

$$23. \quad 2\cos^2 x + \cos x - 1 = 0$$

$$24. \quad 4\cos^2\left(\frac{1}{2}x\right) - 1 = 0$$

$$25. \quad 2\sin^2\theta + 3\sin\theta + 1 = 0$$

$$26. \quad \cos^3 x = \cos x$$

$$27. \quad \cos 2\theta = \sqrt{2} - \cos 2\theta$$