

Solving Trig Equations

$$\text{ex: } \sin x + \sqrt{2} = -\sin x$$

+sinx

+sinx

$$\begin{array}{r} 2\sin x + \sqrt{2} = 0 \\ -\sqrt{2} \quad -\sqrt{2} \end{array}$$

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

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

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

$$\text{ex: } 2\cos(3x) - 1 = 0$$

$$\cos(3x) = \frac{1}{2}$$

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

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

$$x = \frac{\pi}{9}$$

$$\text{ex: } 4\sin^2 x = 3$$

*note $\sin x^2 \neq \sin^2 x = (\sin x)^2$

$$\sin^2 x = \frac{3}{4}$$

$$\sin x = \pm \sqrt{\frac{3}{4}}$$

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

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

$$\begin{array}{cc} \uparrow & \uparrow \\ \sin x = \frac{\sqrt{3}}{2} & \sin x = -\frac{\sqrt{3}}{2} \end{array}$$

recall: $x^2 + 6x + 8 = 0$
 $(x+2)(x+4) = 0$
 $x+2=0$ $x+4=0$
 $x=-2$ $x=-4$

$(2x+3)(5x-7) = 0$
 $x = -\frac{3}{2}$ $x = \frac{7}{5}$

ex: $(2\sin x + 1)(\cos x + 1) = 0$

$2\sin x + 1 = 0$

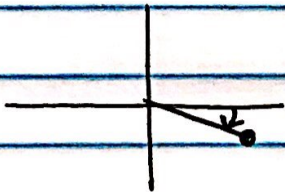
$\cos x + 1 = 0$

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

$\cos x = -1$

$x = -\frac{\pi}{6}$

$x = \pi$



ex: $\tan^5 x = \frac{\tan^3 x}{3}$

$3 \tan^5 x = \tan^3 x$

$3 \tan^5 x - \tan^3 x = 0$

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

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

$\tan x = 0$ $\tan^2 x = \frac{1}{3}$

$x = 0$

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

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

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

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