Ex. $\cos^2\theta - \frac{1}{2}\cos\theta = 0, \ -2\pi \le \theta \le 4\pi$

Let $m = \cos\theta$

$(2)m^2 - \frac{1}{2}^{(2)} m = 0(2)$

$2m^2 - m = 0$

Factor OR Formula

$m(2m-1) = 0$

$= \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$m = 0$ OR $2m - 1 = 0$

$2m = 1$

$m = \frac{1}{2}$

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

(x)

$\cos\theta = 0$

$\frac{\pi}{2} + \frac{2\pi}{1}$

$\frac{\pi}{2} + \frac{4\pi}{2}$

$\theta = \pm\frac{\pi}{2}, \pm\frac{3\pi}{2}, \frac{5\pi}{2}, \frac{7\pi}{2}$

$m = \dfrac{1 \pm \sqrt{1 - 4(2)(0)}}{2(2)}$

$m = \dfrac{1 \pm 1}{4}$

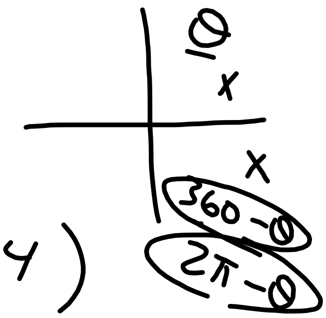
$m = \frac{2}{4}$ OR $m = \frac{0}{4} = 0$

$m = \frac{1}{2}$

$\cos\theta \overset{+}{=} \frac{1}{2}$

(Ref ∢ $60°$, Q 1, 4)

$\frac{\pi}{3}$



Q4

$\frac{2\pi}{1} - \frac{\pi}{3}$

$\frac{6\pi}{3} - \frac{\pi}{3}$

$\theta = \pm\frac{\pi}{3}, \pm\frac{5\pi}{3}, \frac{7\pi}{3}, \frac{11\pi}{3}$

Ex. $6\sin^2 x - \sin x = 2, \underbrace{-2\pi \le \theta \le 4\pi}$

-12

$6\sin^2 x - \sin x - 2 = 0$

$6\sin^2 x - 4\sin x + 3\sin x - 2 = 0$

$2\sin x(3\sin x - 2) + 1(3\sin x - 2) = 0$

$(3\sin x - 2)(2\sin x + 1) = 0$

-12

$6m^2 - m - 2 = 0$

$\left(\frac{6m}{2} - \frac{4}{2}\right)\left(\frac{6m}{3} + \frac{3}{3}\right)$

$(3m-2)(2m+1)$

$3\sin x - 2 = 0$

$3\sin x = 2$

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

$2\sin x + 1 = 0$

$2\sin x = -1$

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

x x

$\pi + \theta$ x x $2\pi - \theta$

(Ref∡ $\underline{42°}$, Q1,2)

(Ref∡ $\underline{30°}$, Q3,4)

$\left(\frac{\pi}{6}\right)$

$x = 42°, 138°, 402°, 498°$
$-318°, -222°$

$x = \frac{7\pi}{6}, \frac{11\pi}{6}, \frac{19\pi}{6}, \frac{23\pi}{6}$
$-\frac{5\pi}{6}, -\frac{\pi}{6}$

$x = \frac{42\pi}{180}, \frac{138\pi}{180}, \frac{402\pi}{180}, \frac{498\pi}{180}$
$-\frac{318\pi}{180}, -\frac{222\pi}{180}$

Your Turn

Solve for θ.

$\cos^2\theta - \cos\theta - 2 = 0,\ 0^\circ \leq \theta < 360^\circ$

Give solutions as exact values where possible. Otherwise, give approximate measures to the nearest thousandth of a degree.

$m^2 - m - 2 = 0$

$(m-2)(m+1) = 0$

$m = 2 \quad m = -1$

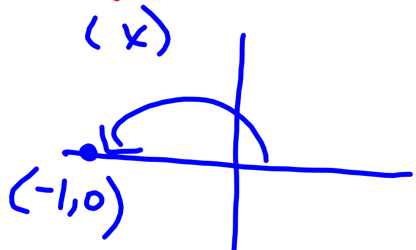
$\cos\theta = 2 \quad \cos\theta = -1$

$\cos\theta = \frac{adj}{hyp}$

$\varnothing$

Not Possible

(x)



$\theta = 180^\circ$

General Solution of a Trigonometric Equation

Solve: $3\cos^2\theta - \cos\theta = 2;\ \theta \in \mathbb{R}$

Degrees

-6

$3m^2 - m - 2 = 0$

$3m^2 - 3m + 2m - 2 = 0$

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

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

$m = 1$

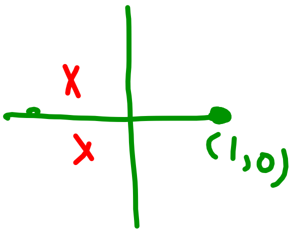
$3m + 2 = 0$

$m = -\frac{2}{3}$

(x)

$\cos\theta = 1$

$\cos\theta = -\frac{2}{3}$



(Ref ∠ 48°, Q2,3)

$\theta = 0^\circ + 360k, k \in I$

or

$\theta = 0^\circ \pm 360k, k \in N$

$\theta = 132^\circ + 360k, k \in I$

$= 228^\circ + 360k, k \in I$

Determine the general solution for $\sin^2 x - 1 = 0$ over the real numbers if x is measured in radians.

$\{x \in R\}$

$x^2 - 25$

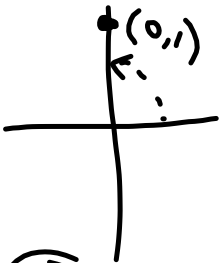
$(x-5)(x+5)$

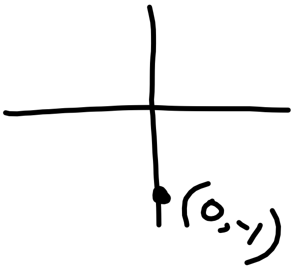
$m^2 - 1 = 0$

$(m-1)(m+1) = 0$

$m = 1 \qquad m = -1$

$\sin x = 1$ (y) $\qquad \sin x = -1$





$x = \frac{\pi}{2} + 2\pi k, k \in I$

$x = \frac{3\pi}{2} + 2\pi k, k \in I$

Did You Know?

$2n$, where $n \in I$, represents all even integers.

$2n + 1$, where $n \in I$, is an expression for all odd integers.

Practice Problems:

Pages 212 - 214
#11 - 23

Attachments

Worksheet - Sketching Angles in Radians.doc

Warm-Up - Intro to Limits.docx

Review - Factoring.pdf

Worksheet - Factoring Review.doc