

Quadratic Trigonometric Equations

Nov. 25/2016

Steps:

- move all the terms to one side of the equal sign so that the equation equals zero
- factor and set each factor to zero, or use the quadratic formula, to solve for the trigonometric ratio
- each factor should involve only one trig ratio
- solve for the RAA for each of the ratios/factors
- apply CAST rule
- determine the angles using RAA
- consider domain and coterminal angles

May 4-12:46 PM

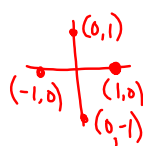
Solving Trigonometric Equations, Part 2Ex: 1) Solve each equation for $0 \leq \theta < 2\pi$

a) $\cos \theta = 2 \sin \theta \cos \theta$

$$0 = 2 \sin \theta \cos \theta - \cos \theta$$

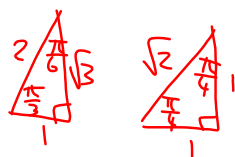
$$0 = \cos \theta (2 \sin \theta - 1)$$

$$\cos \theta = 0$$



$$\theta = \frac{\pi}{2} \text{ or } \frac{3\pi}{2}$$

$$2 \sin \theta - 1 = 0$$



$$2 \sin \theta = 1$$

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

$$\text{RAA} = \frac{\pi}{6}$$

S	A
T	C

$$\theta = \frac{\pi}{6} \text{ or } \frac{5\pi}{6}$$

$$\therefore \theta = \frac{\pi}{6}, \frac{\pi}{2}, \frac{5\pi}{6}, \frac{3\pi}{2}$$

May 4-12:56 PM

b) $\sin^2 \theta + 4 \sin \theta = 5$

$\sin^2 \theta + 4 \sin \theta - 5 = 0$

$(\sin \theta - 1)(\sin \theta + 5) = 0$

$\sin \theta = 1$ or $\sin \theta = -5$

$a^2 + 4a = 5$

$a^2 + 4a - 5 = 0$

$(a - 1)(a + 5) = 0$

$a = 1$ or $a = -5$

no solution

$\theta = \frac{\pi}{2}$

May 4-12:59 PM

c) $\sin 2x - 2 \cos^2 x = 0$ (p.428 # 18a)

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

$2 \cos x (\sin x - \cos x) = 0$

$\cos x = 0$ or $\sin x - \cos x = 0$

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

$\sin x = \cos x$

$P(\cos \theta, \sin \theta)$

$\frac{\sin x}{\cos x} = \frac{\cos x}{\cos x}$

$\tan x = 1$

$\text{RAA} = \frac{\pi}{4}$

$\begin{matrix} \text{S} & \text{A} \\ \text{C} & \text{C} \end{matrix}$ Q1: $x = \frac{\pi}{4}$

Q3: $x = \pi + \frac{\pi}{4}$
 $= \frac{5\pi}{4}$

May 4-1:00 PM

Assigned Work:

p.436 # 1, 3, 6ac, 7bd, 8ad, 9ac, 11, 14, 18

- work period next class
- before work period, try to complete: 1, 3, 6a, 7b, 8a, 9a
- for day after, try to complete: 6c, 7d, 8d, 9c, 11, 14

May 4-1:02 PM