

U6D9_T_SolvingTrigEquations Part 2

Tuesday, May 14, 2019 7:05 AM



U6D9_T_So
lvingTrigE...

U6D9 MCR 3UI

Solving Trigonometric Equations - part 2

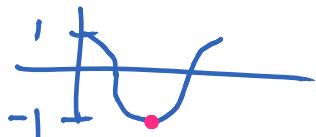
Warm Up: Solve for θ for $0^\circ \leq \theta \leq 360^\circ$

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

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

$$\cos\theta = -1$$

$$\theta = 180^\circ$$



b) $\sin^2\theta - 2\sin\theta + 1 = 0$

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

$$\sin\theta = 1$$

$$\theta = 90^\circ$$



To solve trig equations you generally must only have one type of trig function in the equation.

Use your trig identities to simplify the equation.

PI Pythagorean Identity $\sin^2\theta + \cos^2\theta = 1$

QI Quotient Identity $\tan\theta = \frac{\sin\theta}{\cos\theta}$

RI Reciprocal Identity $\csc\theta = \frac{1}{\sin\theta}$ $\sec\theta = \frac{1}{\cos\theta}$

$$\cot\theta = \frac{1}{\tan\theta}$$

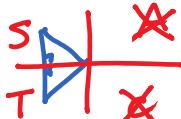
Example 1:

a) $\sec\theta = -2$

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

$$\beta = 60^\circ$$

take reciprocal
on both sides

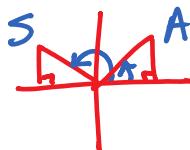


$\theta = 120^\circ \text{ or } 240^\circ$

b) $\csc\theta = \sqrt{2}$

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

$$\beta = 45^\circ$$



$\theta = 45^\circ \text{ or } 135^\circ$

c) $\sin\theta \sec\theta = \sqrt{3}$

$$\sin\theta \left(\frac{1}{\cos\theta}\right) = \sqrt{3}$$

$$\frac{\sin\theta}{\cos\theta} = \sqrt{3}$$

$$\tan\theta = \sqrt{3}$$

$$\beta = 60^\circ$$

$$\theta = 60^\circ \text{ or } 240^\circ$$



d) $6 \cos^2\theta - \sin\theta - 4 = 0$

$$6(1 - \sin^2\theta) - \sin\theta - 4 = 0$$

$$6 - 6\sin^2\theta - \sin\theta - 4 = 0$$

$$-6\sin^2\theta - \sin\theta + 2 = 0$$

$$6\sin^2\theta + \sin\theta - 2 = 0$$

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

$$\sin\theta = -\frac{2}{3} \text{ or } \sin\theta = \frac{1}{2}$$

$$\beta = \sin^{-1}(2/3)$$

$$\beta = 42^\circ$$

$$\beta = 30^\circ$$

$$\begin{array}{r} m=12 \\ A=1 \\ 4 \quad 3 \\ \hline 2 \end{array}$$

$$\theta = 222^\circ, 318^\circ, 30^\circ, \text{ or } 150^\circ$$

e) $2\sin\theta \sec\theta + \sec\theta - 2\sin\theta - 1 = 0$

$$\sec\theta(2\sin\theta + 1) - (2\sin\theta + 1) = 0$$

$$(\sec\theta - 1)(2\sin\theta + 1) = 0$$

$$\sec\theta = 1$$

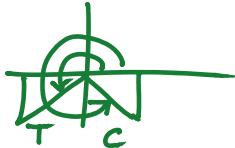
$$2\sin\theta = -1$$

$$\cos\theta = 1$$

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

$$\begin{array}{r} 1 \\ + \\ 1 \\ \hline 2 \end{array}$$

$$\beta = 30^\circ$$



$$\theta = 0^\circ, 360^\circ, 210^\circ \text{ or } 330^\circ$$

U6D9 Practice: Page 408-409 #3bdg, 5def, 11(factor by grouping). Solve

U6D10 Review Practice: p. 412 – 417 #15, 16, 17, 18, 19, 20 degrees only, 21 (a- period=540°, b – period=180°), 22, 24, 25ab, 26, 27b ($\pi/4=4^\circ$, $\pi/2=90^\circ$), 30, 31, 35-37 (in degrees – teacher will provide answers for 35,36, 37)

in degrees.

p. 418 #4cd, 7ab, c(phase shift 45°), 8a, 12(in degrees, teacher will provide answers) (eoo), 9

A few more review questions

Function	Domain	Range	Amplitude	Period	Phase Shift
$y = 2\sin(x - 90^\circ)$					
$y = \frac{1}{2}\cos(x + 90^\circ)$					
$y = \frac{1}{2}\sin(\frac{1}{2}x - 180^\circ) - 2$					
$y = 2\cos\frac{1}{2}(x - 180^\circ) + 1$					