

Precalculus

Lesson 7.3: Trigonometric Equations

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We have studied trigonometric graphs and expressions. The next skill we need to learn is how to solve trigonometric equations.

Determine whether or not θ is a solution for the equation below.

$$\theta = \frac{\pi}{4}, \quad \theta = \frac{\pi}{6}$$

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

Solve for θ .

Give a general formula for all the solutions.

List 8 of the solutions.

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

We can solve linear trigonometric equations:

$$2 \sin \theta + \sqrt{3} = 0, \quad 0 \leq \theta < 2\pi$$

Solve:

$$\sin(2\theta) = \frac{1}{2}, \quad 0 \leq \theta < 2\pi$$

Solve:

$$\tan\left(\theta - \frac{\pi}{2}\right) = 1, \quad 0 \leq \theta < 2\pi$$

Solving a trigonometric quadratic equation:

$$2\sin^2\theta - 3\sin\theta + 1 = 0, \quad 0 \leq \theta < 2\pi$$

Solving with trigonometric identities:

$$3\cos\theta + 3 = 2\sin^2\theta, \quad 0 \leq \theta < 2\pi$$

$$\cos^2\theta + \sin\theta = 2, \quad 0 \leq \theta < 2\pi$$

Graphing utilities are always nice.... solve,
rounding to two decimal places.

$$5 \sin x + x = 3$$

$$\tan \theta = -2, \quad 0 \leq \theta < 2\pi$$