Quadratic Trigonometric Equations

These notes are intended as a supplement of section 7.1 and 7.2 (p. 572 – 600) in your workbook. You should also read the section for more complete explanations and additional examples.

Solving Quadratic Trigonometric Equations

Solve the following quadratic equations for x:

$4x^2 = 1$ $\qquad$ $x^2 - 3x = 0$ $\qquad$ $x^2 + 2x - 3 = 0$

Solving quadratic trigonometric equations is done in virtually the same way. The trigonometric function is treated like a variable until it is isolated. Then, x can be solved for using the inverse trigonometric functions.

Example 1
Solve the equation $4\sin^2 x - 3 = 0$ for all values of x in the interval $0 \leq x \leq 2\pi$.

Example 2

Solve the equation $4\cos^2 x + \cos x = 0$ for all values of x in the interval $0 \le x \le 2\pi$.

Example 3

Solve the equation $(\sin x - 2)(\tan x + 1) = 0$ for all values of x in the interval $0 \le x \le 2\pi$.

Example 4

Solve the equation $2\sin^2 x - 3\sin x + 1 = 0$ for all values of x in the interval $0 \le x \le 2\pi$.

Homework: Supplemental Worksheet #3

Supplemental Worksheet #3

1. Solve the equation $2\sin^2 x + \sin x = 0$ over the interval $0° \le x \le 360°$.

2. Solve the equation $2\sin^2 x - \sin x = 0$ over the interval $0 \le x \le 2\pi$.

3. Solve the following equations over the interval $\frac{\pi}{2} \le x \le \frac{3\pi}{2}$.

   a) $4\cos^2 x = 1$

   b) $2\cos^2 x - 5\cos x - 3 = 0$

   c) $2\sin x + \sqrt{3} = 0$

4. Show that the following is true:

$$2\cos^2 \frac{\pi}{6} - 1 = \cos^2 \frac{\pi}{6} - \sin^2 \frac{\pi}{6}$$

5. If $4\cos x + 3 = 0$ and $\tan x > 0$, find the value of $\sin x$.

6. Evaluate $\sin\left(\frac{-47\pi}{2}\right) \cdot \cos\left(-47\pi\right)$.