The General Solution

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.

General Solutions to Trigonometric Equations

In the previous lessons, we solved trigonometric equations over specific domains. However, since trigonometric functions are periodic, it is possible to find all solutions when the domain is the set of all real numbers. This is called the **general solution**.

Example 1

Solve the equation $2\cos x + \sqrt{2} = 0$ for all values of x such that $x \in \mathbb{R}$.

When a question asks you to find the general solution to a trigonometric equation, follow the steps below:

1. Find the solution(s) for $0 \le x \le 2\pi$.

2. Write the general solution (for $x \in \mathbb{R}$) by adding $2\pi k$ $(k \in \mathbb{Z})$ to each of the solutions found.

Example 2
Solve the equation $4\sin x + 3 = 0$ for all values of x such that $x \in \mathbb{R}$.

Example 3

Solve the equation $2\sin^2 x + 3\sin x - 2 = 0$ for all values of x such that $x \in \mathbb{R}$.

Homework: Supplemental Worksheet #4

Supplemental Worksheet #4

1. Solve the following equations for x where the domain is the set of all real numbers.

   a) $2\sin x - 1 = 0$

   b) $\tan x = 0$

   c) $4\sin^2 x - 1 = 0$

   d) $\left(1+\sin x\right)\left(1-\cos x\right) = 0$

   e) $2\sec x + 4 = 0$

   f) $4\csc x + 6 = 14$

   g) $\left(\sin x - 1\right)\left(2\sec x + 1\right) = 0$

2. Solve the following equations for x over the interval $-2\pi \le x \le 2\pi$.

   a) $4\sin^2 x - 3 = 0$

   b) $5\tan x + 5 = 0$

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