Section 5.3 – Solving Trig Equations

To solve trigonometric equations we use standard algebraic techniques such as collecting like terms and factoring. ALWAYS try to isolate the trig function in the equation.

Examples:

Solve the following trig equations and give all possible solutions in the interval $[0, 2\pi)$.

1. Verifying Solutions of Trig Equations

   Decide if the following are solutions to the equation: $\sin 2x - \frac{1}{2} = 0$

   a) Is $x = \frac{\pi}{12}$ a solution?

   b) Is $x = \frac{11\pi}{12}$ a solution?

2. Solving by getting the Trig Function alone

   $2\sin\theta = 1$

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3. Collecting Like Terms

$\sin\theta + \sqrt{2} = -\sin\theta$

4. Extracting Square Roots

$3\tan^2\theta - 1 = 0$

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5. Factoring
   $\cot\theta\cos^2\theta = \cot\theta$

6. Factoring an Equation of Quadratic Type
   $2\sin^2\theta - \sin\theta - 1 = 0$

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7. Rewriting with a Single Trig Function
$2\sin^2\theta+3\cos\theta-3=0$

8. Squaring and Converting to Quadratic Type (check for extraneous roots)
$\cos\theta+1=\sin\theta$

HW: 5.3, p.396 #2, 5, 7, 10, 11, 14, 15, 22, 23, 26, 27, 30