

## L7 – 5.4 Solve Quadratic Trigonometric Equations

MHF4U

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A quadratic trigonometric equation may have multiple solutions in the interval  $0 \leq x \leq 2\pi$ .

You can often **factor** a quadratic trigonometric equation and then solve the resulting two linear trigonometric equations. In cases where the equation cannot be factored, use the **quadratic formula** and then solve the resulting linear trigonometric equations.

You may need to use a Pythagorean identity, compound angle formula, or double angle formula to create a quadratic equation that contains only a single trigonometric function whose arguments all match.

Remember that when solving a linear trigonometric equation, consider all 3 tools that can be useful:

1. Special Triangles
2. Graphs of Trig Functions
3. Calculator

### Part 1: Solving Quadratic Trigonometric Equations

**Example 1:** Solve each of the following equations for  $0 \leq x \leq 2\pi$

a)  $(\sin x + 1) \left( \sin x - \frac{1}{2} \right) = 0$

**b)**  $\sin^2 x - \sin x = 2$

c)  $2\sin^2 x - 3\sin x + 1 = 0$

## Part 2: Use Identities to Help Solve Quadratic Trigonometric Equations

**Example 2:** Solve each of the following equations for  $0 \leq x \leq 2\pi$

a)  $2\sec^2 x - 3 + \tan x = 0$

**b)**  $3 \sin x + 3 \cos(2x) = 2$