Trigonometric Equations:

Key Points:

- When solving linear trigonometric equations, we can use algebraic techniques just as we do solve algebraic equations. Look for patterns, like the difference of squares, quadratic form, or an expression that lends itself well to substitution.
- Equations involving a single trigonometric function can be solved or verified using the unit circle.
- We can also solve trigonometric equations using a graphing calculator
- Many equations appear quadratic in form. We can use substitution to make the equation appear simpler, and then use the same techniques we use solving an algebraic quadratic: factoring, the quadratic formula, etc.
- We can also use the identities to solve trigonometric equations.

Trigonometric Equations Videos:

- Solving Linear Trigonometric Equations: Example 1
- Solving Equation involving a Single Trigonometric Function: Examples 2-3
- Solving Trigonometric Equations in Quadratic Form: Examples 4-5

Practice Exercises:

For exercise 1-5, find all exact solutions that exist on the interval $[0, 2\pi)$

1. $2\sin\theta = -1$
2. $\tan x + 1 = 0$
3. $2\sin^2 x - \sin x = 0$
4. $2\sin^2 x + 5\sin x + 3 = 0$
5. $\frac{1}{\sec^2 x} + 2 + \sin^2 x + 4\cos^2 x = 0$

Use a calculator to find the solutions on the interval $[0, 2\pi)$. Round to 4 decimal places

6. $\csc^2 x - 3\csc x - 4 = 0$

Answers:

1. $\frac{7\pi}{6}, \frac{11\pi}{6}$

2. $\frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$

3. $0, \frac{\pi}{6}, \frac{5\pi}{6}, \pi$

4. $\frac{3\pi}{2}$

5. No solution

6. $0.2527, 2.8889, 4.7124$