5.2 Solving Trig Equations with Factoring

~~Warm Up in your notes~~

Factor the following expressions.

1. $2x^2+17x+21$

$(2x+3)(x+7)$

42

14 3

17

$y = \#/x$

$(2x^2+14x)+(3x+21)$

$2x(x+7)+3(x+7)$

$\boxed{(x+7)(2x+3)}$

2. $\sin^2 x+5\sin x+6$

Let $\sin x = y$

y^2+5y+6

$(y+2)(y+3)$

$\boxed{(\sin x+2)(\sin x+3)}$

5.2 Solving Trig Equations with Factoring

EQ: How do I use factoring to solve trig equations?

1. $\sin x \sec x = \sin x \qquad x \in [0, 2\pi)$

$-\sin x \quad -\sin x$

DON'T DIVIDE BY TRIG FUNCTIONS

$\sin x \sec x - \sin x = 0$

$\sin x(\sec x - 1) = 0$

$\sin x = 0$

$x = \sin^{-1}(0)$

unit circle y-coord = 0

$0, \pi$

$\sec x - 1 = 0$

$+1 \quad +1$

$\sec x = 1$

$x = \sec^{-1}(1)$

$\frac{1}{\cos}$ x-coord

0

① Solve for "0" (everything on same side)

② Factor (GCF)

③ Set each factor = 0 & solve

$\boxed{0, \pi}$

5.2 Solving Trig Equations with Factoring

EQ: How do I use factoring to solve trig equations?

2. $2\sin^2 x - 5\sin x - 3 = 0 \quad x \in [0, 2\pi)$

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

$\sin x - 3 = 0$

$+3 \quad +3$

$\sin x = 3$

$x = \sin^{-1}(3)$

y-coord 3 DNE

$2\sin x + 1 = 0$

$-1 \quad -1$

$\frac{2\sin x}{2} = \frac{-1}{2}$

$\sin x = -\frac{1}{2}$

$x = \sin^{-1}\left(-\frac{1}{2}\right)$

-6

$-6 \quad 1$

-5

$2y^2 - 5y - 3$

$(2y^2 - 6y)(+1y - 3)$

$2y(y-3) + 1(y-3)$

$(y-3)(2y+1)$

$\boxed{\frac{11\pi}{6}, \frac{7\pi}{6}}$

5.2 Solving Trig Equations with Factoring

EQ: How do I use factoring to solve trig equations?

8. $4\csc^2 x + 4\csc x + 1 = 0 \quad x \in [0, 2\pi)$

$(2\csc x + 1)(2\csc x + 1) = 0$

$4x^2 + 4x + 1$

4×4, 2×2

$(4x^2 + 2x)(+2x + 1)$

$2x(2x+1) + 1(2x+1)$

$(2x+1)(2x+1)$

$2\csc x + 1 = 0$

$-1 \quad -1$

$\frac{2\csc x}{2} = \frac{-1}{2}$

$\csc x = \frac{-1}{2}$

$x = \csc^{-1}\left(-\frac{1}{2}\right)$

$\sin^{-1}(-2)$

$\boxed{\text{NO SOLUTION}}$

5.2 Solving Trig Equations (Day 2) **Name:**_____

Solve each equation in the domain [0, 2π). Use a separate sheet of paper.

1. $2\sin^2 x + \sin x = 0$
2. $2\sin x\cos x = \sqrt{2}\cos x$
3. $2\cos^2 x - 5\cos x + 2 = 0$
4. $2\sec^2 x - 3\sec x - 2 = 0$
5. $\sin^2 x + 5\sin x + 6 = 0$
6. $\tan x \sec x = \tan x$
7. $\tan^2 x + \tan x = 0$
8. $4\csc^2 x + 4\csc x + 1 = 0$

Both 5.1 & 5.2 (with work shown) will be stamped tomorrow.
GREEN HW calendar due Friday 11/17.
(3 stamps)

5.4 Solving Trig Equations with Factoring

~~Closing~~ $x \in [0, 2\pi)$

$$2\sin^2 x + 9\sin x + 4 = 0$$