5.4 Solving Trig Equations with Factoring

~~Warm Up Thursday~~

Factor the following expressions.

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

42
14 3
17

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

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

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

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

Let $\sin x = x$

x^2+5x+6

6
3 2
5

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

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

~~About Me~~

1. If you were reborn in a new life, would you rather be alive in the past or future?

2. What era in American history is most interesting to you?

5.4 Solving Trig Equations with Factoring

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

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

DO NOT DIVIDE BY TRIG FUNCTION

radians

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

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

$\boxed{0, \pi}$

$\sin x = 0$

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

$0, \pi$

$\sec x - 1 = 0$

$+1 \quad +1$

$\sec x = 1$

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

$\cos = 1$

0

5.4 Solving Trig Equations with Factoring

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

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

Let $\sin x = x$

$2x^2 - 5x - 3 = 0$

$1 \quad -6 \quad -6 \quad -5$

$(2x^2 + 1x)(-6x - 3) = 0$

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

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

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

$2\sin x + 1 = 0$

$-1 \quad -1$

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

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

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

$\sin x - 3 = 0$

$+3 \quad +3$

$\sin x = 3$

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

DNE

5.4 Solving Trig Equations with Factoring

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

3. $4\csc^2 x + 4\csc x + 1 = 0 \quad x \in [0, 2\pi)$

$4x^2 + 4x + 1 = 0$ Let $\csc x = x$

$(4x^2 + 2x)(+2x + 1) = 0$

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

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

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

$2\csc x + 1 = 0$

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

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

DNE

sin -2

NO SOLUTION

5.4 Solving Trig Equations with Factoring

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

4. $3-3\sin x-2\cos^2 x=0 \quad x\in[0,2\pi)$

5.4 Solving Trig Equations (Day 2) Name:_____

Solve each equation in the domain $[0, 2\pi)$. 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. $\sin 2x + \sqrt{3}\sin x = 0$
4. $2\cos^2 x - 5\cos x + 2 = 0$
5. $2\sec^2 x - 3\sec x - 2 = 0$
6. $\sin^2 x + 5\sin x + 6 = 0$
7. $\tan^2 x - \sec x - 1 = 0$
8. $\tan x \sec x = \tan x$
9. $\tan^2 x + \tan x = 0$
10. $4\csc^2 x + 4\csc x + 1 = 0$
11. $3 - 3\sin x - 2\cos^2 x = 0$

5.4 Solving Trig Equations with Factoring

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

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