WARM UP 5.3b

On a clean sheet of paper, use complete sentence(s) to answer the following question in your own words:

What is the period for y=sin(x), y=cos(x), and y=tan(x)? 2π 2π π

How do you use this to solve for the general solution (infinite number of solutions) of trigonometric equations?

$\sin x \quad \cos x$ $+2\pi n$ $\quad \tan(x)$ $+\pi n$

Oct 28-4:03 PM

Equations Quadratic in Form

Strategy:

- Factor or use Quadratic Formula to solve for trigonometric expression
- Use Unit Circle to find solution, if possible
- If answer is not exact, use inverse function

$x = \sin x$

$2x^2 - x - 1 = 0$

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

Find all solutions of the equation in the interval $[0, 2\pi)$.

$2\sin^2 x - \sin x - 1 = 0$

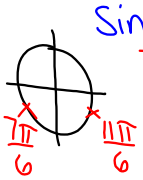
$(2\sin x + 1)(\sin x - 1) = 0$

$2\sin x + 1 = 0$ $\quad \sin x - 1 = 0$

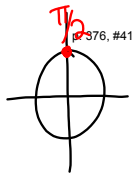
$-1 \quad -1 \qquad +1 \quad +1$

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

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



$x = \frac{7\pi}{6}, \frac{11\pi}{6}, \frac{\pi}{2}$



p. 376, #41 (HW)

Oct 28-4:17 PM

Example

Find all solutions of the equation in the interval $[0, 2\pi)$ algebraically. Then use a calculator to check your work.

$\sec^2 x - 2\tan x = 4$

Strategy:

- Factor or use Quadratic Formula to solve for trigonometric expression
- Use Unit Circle to find solution, if possible
- If answer is not exact, use inverse function

p. 376, #47 (HW)

Oct 28-4:23 PM

Approximating Solutions Using a Graphing Calculator

Example

Use a graphing utility to approximate the solutions of the equation in the interval $[0, 2\pi)$ by setting the equation equal to 0, graphing the new equation, and using the zero or root feature to approximate the x-intercepts of the graph.

$\underbrace{\frac{1+\sin x}{\cos x} + \frac{\cos x}{1+\sin x}}_{y_1} = \underbrace{4}_{y_2}$

$x \approx 1.047$

$x \approx 5.236$

p. 377, #55 (HW)

Oct 28-4:50 PM

Example (p. 378, #99)

The monthly sales S (in thousands of units) of lawn mowers are approximated by

$$S = 74.50 - 43.75\cos\frac{\pi t}{6} > 100$$

where t is the time (in months), with t=1 corresponding to January. Determine the months during which sales exceed 100,000 units.

4.19 7.81

April to July

p. 378, #100 (HW)

Oct 28-4:53 PM

HOMEWORK

...solve, solve, solve!

5.3b (p. 376-378): 35, 39, 41, 47, 51, 55, 85, 100, 101

Don't forget--Basic Identities Quiz 3 of 3 tomorrow

Oct 28-3:22 PM