

Change #3 -3 to 3 Key

#6 -4 to 4

Pre-Calc UNIT 7 REVIEW/CHECK - SOLVING TRIG EQUATIONS

Name: _____

Book: page 619 19, 23, 25, 29, 35, 43, 45, 51, 53, 55, 57, 59, 61, 63, 65, 113, 125**

Solve over the interval $[0, 2\pi)$

1) $\sin \frac{2x}{3} = -1$

let $k = \frac{2x}{3}$

$\sin k = -1$

$k = \frac{3\pi}{2}$

$\frac{3}{2} \cdot \frac{2x}{3} = \frac{3\pi}{2} \cdot \frac{3}{2}$

$x = \frac{9\pi}{4}$ ∴ no solution

2) $\sin x \sec x = \sec x$

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

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

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

$\frac{1}{\cos x} = \frac{0}{1}$

undefined

$\sin x = 1$

$x = \pi/2$

3) $9 \cot^2 \theta = -3$

$\cot^2 \theta = -\frac{3}{9}$

$\cot^2 \theta = \pm \sqrt{-\frac{1}{3}}$

imaginary

∅

if $9 \cot^2 \theta = 3$

$\cot^2 \theta = \frac{1}{3}$

$\cot \theta = \pm \sqrt{\frac{1}{3}}$

$\cot \theta = \pm \frac{1}{\sqrt{3}}$

$\tan \theta = \pm \sqrt{3}$

$\rightarrow \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

4) $\cos(2x) = -\frac{1}{2}$

let $k = 2x$

$\cos k = -\frac{1}{2}$

$k = \frac{2\pi}{3}$ $k = \frac{4\pi}{3}$

$2x = \frac{2\pi}{3} + 2\pi$ $2x = \frac{4\pi}{3} + 2\pi$

$x = \frac{\pi}{3} + \pi$ $x = \frac{2\pi}{3} + \pi$

so also

$x = \frac{4\pi}{3}$ $x = \frac{5\pi}{3}$

see below



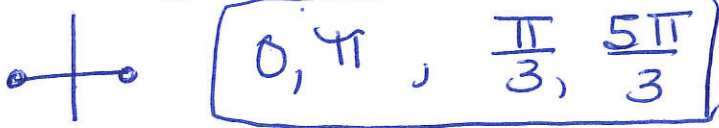
5) $\tan x \sec x = 2 \tan x$

$\tan x \sec x - 2 \tan x = 0$

$\tan x (\sec x - 2) = 0$

$\tan x = 0 \quad \sec x = \frac{2}{1}$

$\frac{y}{x} = \frac{0}{2} \quad \cos x = \frac{1}{2}$



7) $4 \cos^2 x + 4 \sin x = 5$

$4(1 - \sin^2 x) + 4 \sin x - 5 = 0$

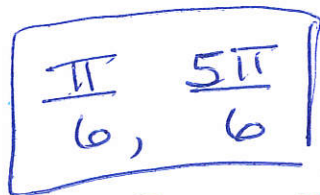
$-4 \sin^2 x + 4 \sin x - 1 = 0$

$4 \sin^2 x - 4 \sin x + 1 = 0$

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

$2 \sin x = 1$

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



9) $\sin \frac{x}{2} = \frac{\sqrt{3}}{2}$

let $u = \frac{x}{2}$

$\sin u = \frac{\sqrt{3}}{2}$

$u = \frac{\pi}{3} + 2\pi \quad u = \frac{2\pi}{3} + 2\pi$
 $\frac{x}{2} = \frac{\pi}{3} + 2\pi \quad \frac{x}{2} = \frac{2\pi}{3} + 2\pi$

6) $3 \sec^2 \theta = -4$

* see below

$\sec^2 x = -\frac{4}{3}$

$\sec x = \pm \sqrt{-\frac{4}{3}}$

if $3 \sec^2 \theta = -4$

$\sec^2 \theta = -\frac{4}{3}$

$\sec \theta = \pm \frac{2}{\sqrt{3}}$

$\cos \theta = \pm \frac{\sqrt{3}}{2}$

8) $(\cos x + \sin x)^2 = 1$

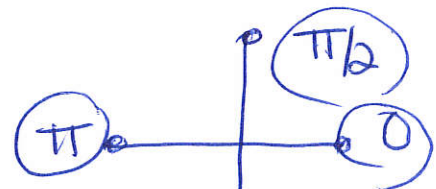
$\cos^2 x + 2 \cos x \sin x + \sin^2 x = 1$

$1 + 2 \cos x \sin x = 1$

$2 \cos x \sin x = 0$

$\cos x \sin x = 0$

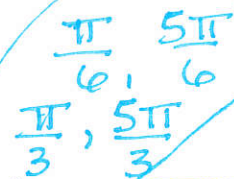
$\cos x = 0 \quad \sin x = 0$



10) $4 \sin x \cos x - 2 \sin x - 2 \cos x + 1$

$2 \sin x (2 \cos x - 1) - 1 (2 \cos x - 1)$

$(2 \sin x - 1)(2 \cos x - 1) = \frac{1}{2}$
 $\sin x = \frac{1}{2} \quad \cos x = \frac{1}{2}$



$x = \frac{2\pi}{3} + 2\pi \quad x = \frac{4\pi}{3} + 2\pi$