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

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

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

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

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

undefined $\quad \boxed{x = \pi/2}$

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

see below

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

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

imaginary

$\emptyset$

↳ if $9\cot^2\theta = 3$

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

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

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

$\tan\theta = \pm\sqrt{3}$ → $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

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

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

$K = \frac{2\pi}{3}$ $\quad K = \frac{4\pi}{3}$

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

$\boxed{x = \frac{\pi}{3} \quad x = \frac{2\pi}{3}}$

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

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

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

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

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

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

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

* see below

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

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

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

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

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

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

$\pi/6, 5\pi/6, 7\pi/6, 11\pi/6$

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

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

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

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

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

$2\sin x = 1$

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

$\frac{\pi}{6}, \frac{5\pi}{6}$

8) $\cos x + \sin x = 1$

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

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

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

$2\cos x \sin x = 0$

$\cos x \sin x = 0$

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