7.3 Classwork Day 2

Name: _____

Date:

Period: _____

Solve each equation over the interval $[0, 2\pi]$.

1) $\tan^2 \theta = 1/3$

2) $4 \sec \theta + 6 = -2$

3) $\sec (3\theta / 2) = -2$

4) $\sin^2 \theta - 1 = 0$

5) $\tan \theta + 1 = 0$

6) $\tan (\theta/2 + \pi/3) = 1$

7) $\sin^2 \theta - \cos^2 \theta = 1 + \cos \theta$

8) $\tan \theta = 2 \sin \theta$

9) $\cos \theta - \sin (-\theta) = 0$

10) $\csc^2 \theta = \cot \theta + 1$

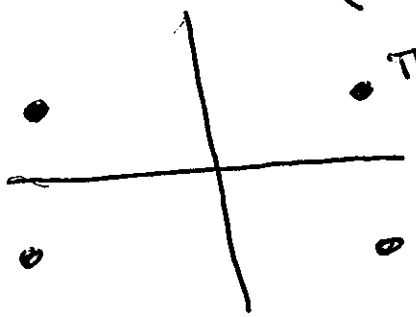
7.3 classwork day 2

① $\tan^2\theta = \frac{1}{3}$

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

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

$\theta = \{\pi/6, 5\pi/6, 7\pi/6, 11\pi/6\}$



② $4\sec\theta + 6 = -2$

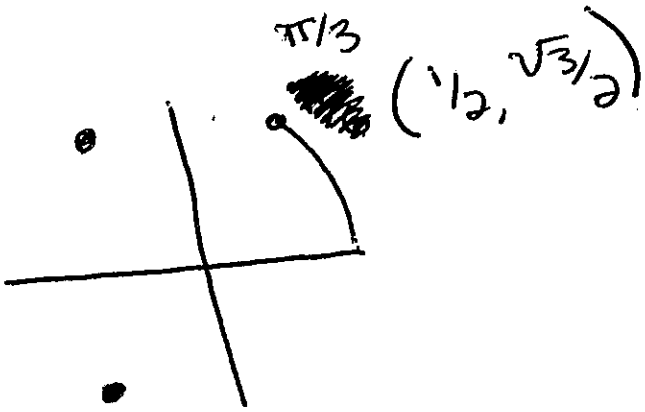
$4\sec\theta = -8$

$\sec\theta = -2$

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

$\cos\theta = -1/2$

$\theta = \{2\pi/3, 4\pi/3\}$

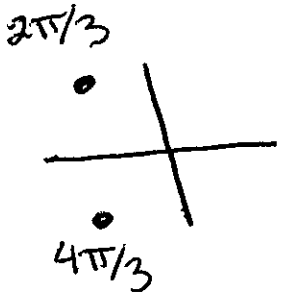


7.3 classwork day 2 continued

(3) $\sec\left(\frac{3\theta}{2}\right) = -2$

$$\frac{1}{\cos\left(\frac{3\theta}{2}\right)} = -2$$

$$\cos\left(\frac{3\theta}{2}\right) = -\frac{1}{2}$$



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

$$\theta = \frac{4\pi}{9} + \frac{4\pi k}{3}$$

$k=0 \quad \theta = \frac{4\pi}{9}$

$k=1 \quad \theta = \frac{16\pi}{9}$

$k=2 \quad \theta =$ over 2π

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

$$\theta = \frac{8\pi}{9} + \frac{4\pi k}{3}$$

$k=0 \quad \theta = \frac{8\pi}{9}$

$k=1 \quad \theta =$ over 2π

$$\theta = \frac{4\pi}{9}, \frac{8\pi}{9}, \frac{16\pi}{9}$$

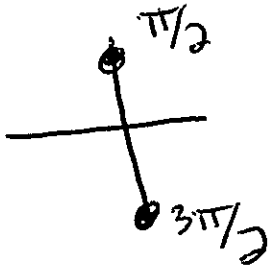
7.3 classwork day 2 continued

(4) $\sin^2\theta - 1 = 0$

$\sin^2\theta = 1$

$\sin\theta = \pm 1$

$\theta = \{\pi/2, 3\pi/2\}$

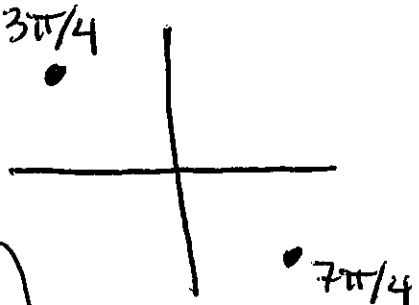


(5) [illegible]

$\tan\theta + 1 = 0$

$\tan\theta = -1$

$\theta = \{\frac{3\pi}{4}, 7\pi/4\}$



7.3 classwork day 2 continued

⑥ $\tan\left(\frac{\theta}{2}+\frac{\pi}{3}\right)=1$

$\frac{\theta}{2}+\frac{\pi}{3}=\tan^{-1}(1)$

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

$\frac{\theta}{2}=-\frac{\pi}{12}+\pi k$

$\theta=-\frac{\pi}{6}+2\pi k$

$*k=0,\ \theta=-\frac{\pi}{6}$

$*k=1,\ \theta=\frac{11\pi}{6}$

$\frac{\theta}{2}+\frac{\pi}{3}=\frac{5\pi}{4}+\pi k$

$\frac{\theta}{2}=\frac{11\pi}{12}+\pi k$

$\theta=\frac{11\pi}{6}+2\pi k$

$*k=0,\ \theta=\frac{11\pi}{6}$

$\theta=\frac{11\pi}{6}$

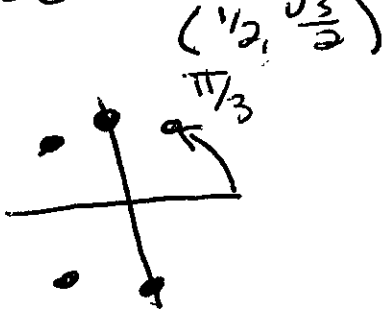
7.3 classwork day 2 continued

(7) $\sin^2\theta - \cos^2\theta = 1 + \cos\theta$

$\sin^2\theta - \cos^2\theta = (\sin^2\theta + \cos^2\theta) + \cos\theta$

$0 = 2\cos^2\theta + \cos\theta$

$0 = \cos\theta(2\cos\theta + 1)$



$\cos\theta = 0$ $\quad\quad$ $\cos\theta = -\frac{1}{2}$

$\theta = \{\pi/2, 3\pi/2\}$ $\quad$ $\theta = \{\frac{2\pi}{3}, \frac{4\pi}{3}\}$

$\theta = \pi/2, \frac{2\pi}{3}, 4\pi/3, 3\pi/2$

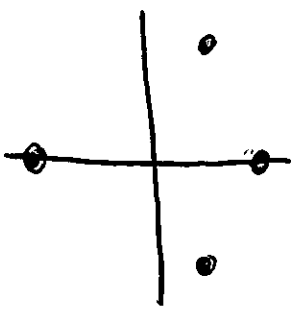
(8) $\tan\theta = 2\sin\theta$

$\frac{\sin\theta}{\cos\theta} = 2\sin\theta$

$\sin\theta = 2\sin\theta\cos\theta$

$0 = 2\sin\theta\cos\theta - \sin\theta$

$0 = \sin\theta(2\cos\theta - 1)$



$\sin\theta = 0$ $\quad\quad$ $\cos\theta = \frac{1}{2}$

$\theta = \{0, \pi\}$ $\quad$ $\{\pi/3, 5\pi/3\}$

$\theta = \{0, \pi/3, \pi, 5\pi/3\}$

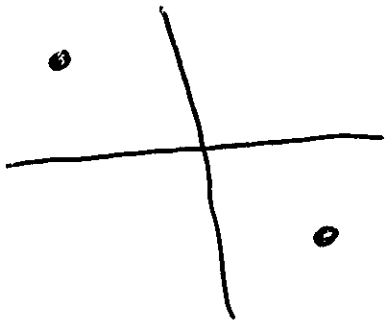
7.3 classwork day 2 continued

(9) $\cos\theta - \sin(-\theta) = 0$

$\cos\theta + \sin\theta = 0$

$\cos\theta = -\sin\theta$

$1 = -\frac{\sin\theta}{\cos\theta}$



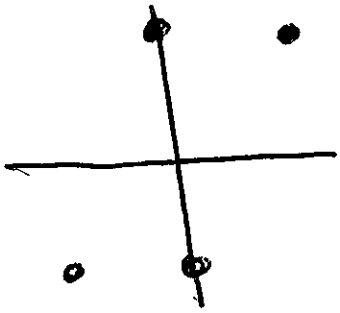
$-\tan\theta = 1$

$\tan\theta = -1$

$\theta = \left\{\frac{3\pi}{4}, \frac{7\pi}{4}\right\}$

(10) $\csc^2\theta = \cot\theta + 1$

$(1 + \cot^2\theta) = \cot\theta + 1$



$\cot^2\theta - \cot\theta = 0$

$\cot\theta(\cot\theta - 1) = 0$

$\cot\theta = 0$ $\quad$ $\cot\theta = 1$

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

$\cos\theta = 0$ $\quad$ $\cos\theta = \sin\theta$

$\theta = \left\{\frac{\pi}{2}, \frac{3\pi}{2}\right\}$ $\quad$ $\theta = \left\{\pi/4, \frac{5\pi}{4}\right\}$

$\theta = \left\{\pi/2, \pi/4, \frac{3\pi}{2}, \frac{5\pi}{4}\right\}$