7.3 Trigonometric Equations Day 2

Solve $\sin^2\theta - 1 = 0$, $0 \leq \theta < 2\pi$.

$$\sin^2\theta = 1$$

$$\sin\theta = \pm 1$$

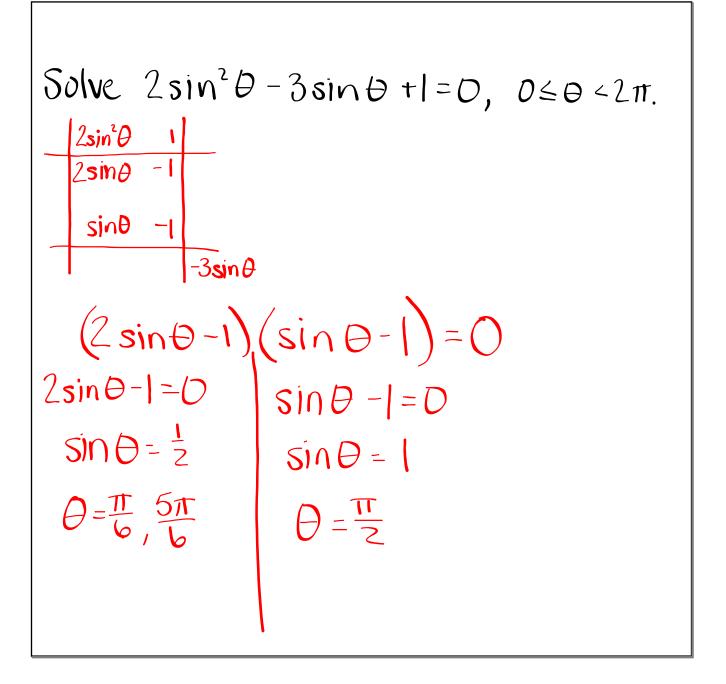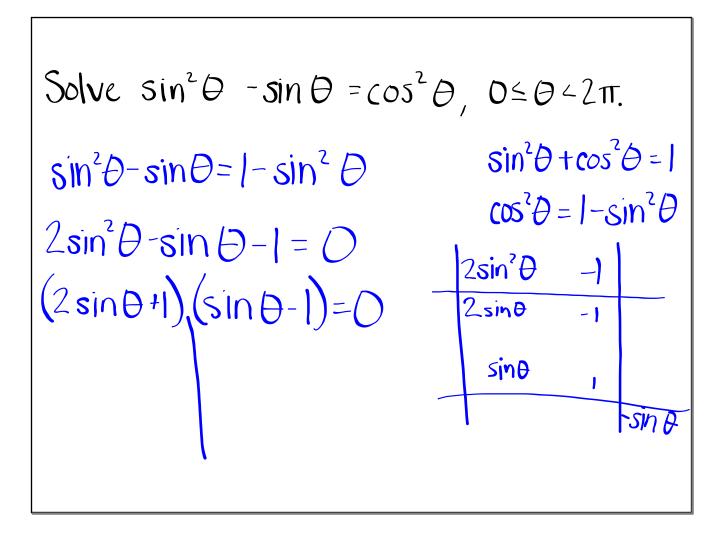$$\theta = \frac{\pi}{2}, \frac{3\pi}{2}$$

Solve $2\cos^2\theta - \cos\theta - 1 = 0$, $0 \leq \theta < 2\pi$.

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

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

$2\cos^2\theta$	-1
$2\cos\theta$	-1
$\cos\theta$	1
	$-\cos\theta$

$2\cos\theta + 1 = 0$

$2\cos\theta = -1$

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

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

$\cos\theta - 1 = 0$

$\cos\theta = 1$

$\theta = 0$

Solve $2\sin^2\theta - 3\sin\theta + 1 = 0$, $0 \leq \theta < 2\pi$.

$2\sin^2\theta$	1
$2\sin\theta$	-1
$\sin\theta$	-1

$-3\sin\theta$

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

$2\sin\theta - 1 = 0$

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

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

$\sin\theta - 1 = 0$

$\sin\theta = 1$

$\theta = \frac{\pi}{2}$

Solve $\sin^2\theta - \sin\theta = \cos^2\theta$, $0 \le \theta < 2\pi$.

$\sin^2\theta - \sin\theta = 1 - \sin^2\theta$

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

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

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

$\cos^2\theta = 1 - \sin^2\theta$

$2\sin^2\theta$	-1
$2\sin\theta$	-1
$\sin\theta$	1

$-\sin\theta$

Solve $3\cos\theta + 3 = 2\sin^2\theta$, $0 \le \theta < 2\pi$.

$3\cos\theta + 3 = 2(1 - \cos^2\theta)$

$3\cos\theta + 3 = 2 - 2\cos^2\theta$

$2\cos^2\theta + 3\cos\theta + 1 = 0$

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

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

$\sin^2\theta = 1 - \cos^2\theta$

$2\cos^2\theta$	$+1$
$2\cos\theta$	1
$\cos\theta$	1
	$3\cos\theta$

Solve $\cos^2\theta + \sin\theta = 2$, $0 \leq \theta < 2\pi$.

$1 - \sin^2\theta + \sin\theta = 2$

$-\sin^2\theta + \sin\theta - 1 = 0$

$\sin^2\theta - \sin\theta + 1 = 0$

discriminant $b^2 - 4ac$

$(-1)^2 - 4(1)(1)$

no solution -3

Solve $3\sin^2\theta = \cos^2\theta$, $0 \le \theta < 2\pi$.

$$3\sin^2\theta = 1 - \sin^2\theta$$

$$4\sin^2\theta = 1$$

$$\sin^2\theta = \frac{1}{4}$$

$$\sin\theta = \pm\frac{1}{2}$$

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