Warm Up 3/5

Solve $[0, 2\pi)$

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

$$(1-\sin^2\theta)\sin\theta = \frac{1}{2}\sin\theta$$

$$(1-\sin^2\theta)\sin\theta - \frac{1}{2}\sin\theta = 0$$

$$\sin\theta\left(1-\sin^2\theta-\frac{1}{2}\right) = 0$$

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

$0, \pi$ $\quad$ $\frac{1}{2} = \sin^2\theta$

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

$\pm\frac{\sqrt{2}}{2} = \sin\theta$ $\quad$ $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

5.3 day 3 ex 6

Goal: Be able to solve trigonometric equations using the method of squaring both sides.

- helpful when neither side is a pythagorean identity, & there are no other options

- hint: must get like terms on the same side of equation

* when we square we may create extraneous solutions so we must ✓ our answers in original problem

ex) $(\sec x+1)^2=(\tan x)^2$ $\quad x\in[0,2\pi]$

$\sec^2 x+2\sec x+1=\tan^2 x$

$\sec^2 x+2\sec x+1=\sec^2 x-1$
$-\sec^2 x \qquad\qquad -\sec^2 x$

$2\sec x+1=-1$
$-1 \qquad -1$
$2\sec x=-2$
$\sec x=-1$
$\boxed{x=\pi}$

$\sec\pi+1 = \tan\pi$
$-1+1=0$
$0=0$

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

$\sin^2 x=1+2\cos x+\cos^2 x$
$1-\cos^2 x=1+2\cos x+\cos^2 x$
$-1 \quad +\cos^2 x \qquad -1 \qquad +\cos^2 x$
$0=2\cos x+2\cos^2 x$
$0=2\cos x(1+\cos x)$

$2\cos x=0 \qquad 1+\cos x=0$
$\cos x=0 \qquad \cos x=-1$

$\boxed{\frac{\pi}{2}}$, $\cancel{3\frac{\pi}{2}}$ $\qquad \boxed{\pi}$

$\sin\pi=1+\cos\pi$
$0=1+(-1)$

$\sin\frac{\pi}{2}=1+\cos\frac{\pi}{2}$
$1=1+0$

$\sin\frac{3\pi}{2}=1+\cos\frac{3\pi}{2}$
$-1=1+0$