More Trig Equations

3 considerations when solving for θ:

1) **Domain** - answer in degrees or radians (check calculator)
   - brackets/inequalities signs (included or not)

2) **Exact** - use unit circle
   Non-exact - use calculator
   *could have both types in same question

3) **Reciporcals** - need to flip to become tan/cos/sin

Solve for θ

ex 1) $\sqrt{3}\sec\theta + 2 = 0$ over $[\pi, \frac{3\pi}{2}]$ Rads

$\sqrt{3}\sec\theta = -2$

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

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

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

ex 2) $\csc^2\theta + \csc\theta \cdot 6 = 0$ over $[\frac{\pi}{2}, \frac{3\pi}{2}]$

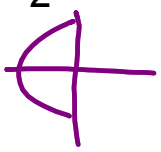
$(\csc\theta + 3)(\csc\theta - 2) = 0$

(½) $\csc\theta = -3$ $\csc\theta = 2$ (½)

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

$\theta_r = 0.340$ $\theta = \frac{5\pi}{6}$ (½)

$\theta = 3.481$ (½)



ex 3) $2\cos\theta\sin\theta = \cos\theta$ general solution

Let $\cos\theta = x$, $\sin\theta = y$

$2xy = x$

$2xy - x = 0$

$x(2y - 1) = 0$

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

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

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

$\theta = \frac{3\pi}{2} + 2\pi k$ $\theta = \frac{5\pi}{6} + 2\pi k$ $k \in I$

ex 4) $1\cos^2 x + 2\cos x - 2 = 0 \qquad 0<x<2\pi$

(a) (b) (c)

$$\cos x = \frac{-2 \pm \sqrt{2^2-4(1)(-2)}}{2(1)} \qquad x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$= \frac{-2 \pm \sqrt{12}}{2}$$

$$= \frac{-2 \pm 2\sqrt{3}}{2}$$

$$\cos x = -1 \pm \sqrt{3}$$

S A T C

$x_r = \cos^{-1}(-1+\sqrt{3}) \qquad x_r = \cos^{-1}(-1-\sqrt{3})$

$x_r = 0.749$

$x = 0.749, 5.534$