Warm-up #10:
Solving Trig Equations

Ex. Solve: $[0, 2\pi)$

1. $3\csc\theta = \sqrt{3}\csc\theta\tan\theta$

$3\csc\theta - \sqrt{3}\csc\theta\tan\theta = 0$

$\csc\theta(3 - \sqrt{3}\tan\theta) = 0$

$\csc\theta = 0$

$\sin\theta = \frac{1}{0} = \varnothing$

not possible ↑

$3 - \sqrt{3}\tan\theta = 0$

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

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

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

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

2. $-\sin\theta + 2\sin^2\theta - 3 = -2$
$\quad +2 \quad +2$

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

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

$2\sin\theta + 1 = 0$

$2\sin\theta = -1$

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

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

$\sin\theta - 1 = 0$

$\sin\theta = 1$

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