November 1

SWBAT:

Solve trig equations

for $0 \le x \le 2\pi$
Solve:
$3\tan^2(x) - 1 = 0$

$3\tan^2(x)-1=0$
$+1 \quad +1$
$\frac{3\tan^2(x)}{3} = \frac{1}{3}$

$\tan^2(x) = \frac{1}{3}$

$\sqrt{(\tan(x))^2} = \sqrt{\frac{1}{3}}$

$\tan(x) = \frac{\pm 1}{\sqrt{3}}$

$\tan^{-1}(\tan(x)) = \tan^{-1}\left(\frac{\pm 1}{\sqrt{3}}\right)$

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

$3y^2-1=0$
$+1 \quad +1$
$\frac{3y^2}{3} = \frac{1}{3}$

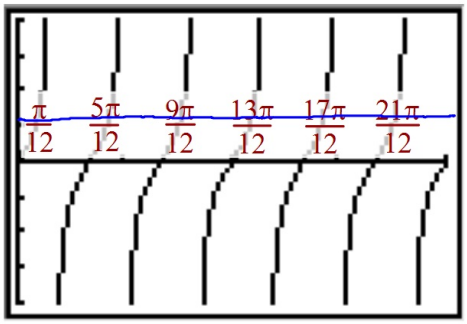
$\sqrt{y^2} = \sqrt{\frac{1}{3}}$

$y = \frac{\pm 1}{\sqrt{3}}$

Find all solutions on the interval $[0, 2\pi)$

$0 \le x < 2\pi$

$\tan(3x)=1$



go up to 6π because $b=3$, $(2\pi \cdot 3 = 6\pi)$

$\tan(3x) = 1$

$\tan^{-1}(\tan(3x)) = \tan^{-1}(1)$

$3x = \frac{\pi}{4}, \frac{5\pi}{4}, \frac{\pi}{4}+2\pi, \frac{5\pi}{4}+2\pi, \frac{\pi}{4}+4\pi, \frac{5\pi}{4}+4\pi$

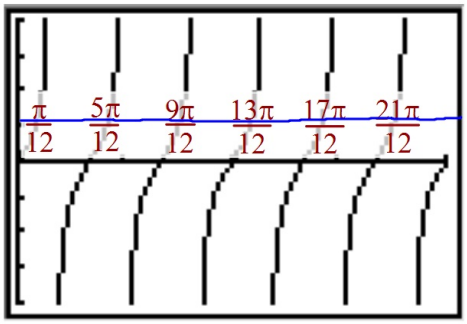
$\frac{3x}{3} = \frac{\frac{\pi}{4}}{3}, \frac{\frac{5\pi}{4}}{3}, \frac{\frac{9\pi}{4}}{3}, \frac{\frac{13\pi}{4}}{3}, \frac{\frac{17\pi}{4}}{3}, \frac{\frac{21\pi}{4}}{3}$

$x = \frac{\pi}{12}, \frac{5\pi}{12}, \frac{9\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12}, \frac{21\pi}{12}$

Find all solutions on the interval $[0, 2\pi)$

$0 \le x < 2\pi$

$\tan(3x)=1$



multiply interval by 3 because $b=3$

$\tan(3x) = 1$

$\tan^{-1}(\tan(3x)) = \tan^{-1}(1)$

$3x = \frac{\pi}{4}, \frac{5\pi}{4}, \frac{\pi}{4}+2\pi, \frac{5\pi}{4}+2\pi, \frac{9\pi}{4}+2\pi, \frac{13\pi}{4}+2\pi$

$\frac{3x}{3} = \frac{\frac{\pi}{4}}{3}, \frac{\frac{5\pi}{4}}{3}, \frac{\frac{9\pi}{4}}{3}, \frac{\frac{13\pi}{4}}{3}, \frac{\frac{17\pi}{4}}{3}, \frac{\frac{21\pi}{4}}{3}$

$x = \frac{\pi}{12}, \frac{5\pi}{12}, \frac{9\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12}, \frac{21\pi}{12}$