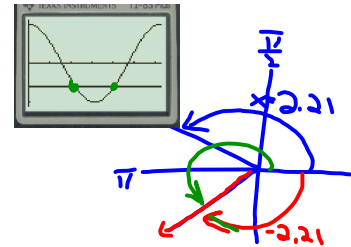


### Lesson #5.4: Solve Trigonometric Equations

$$0 \leq x \leq 2\pi$$

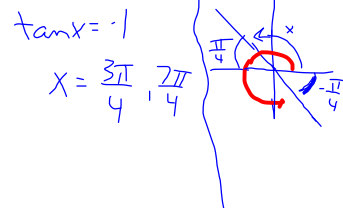
**Example #1:** Determine approximate solutions for  $\cos x + 0.6 = 0$  in the interval  $x \in [0, 2\pi]$ , to the nearest hundredth of a radian. Verify using your TI83+.

$$\begin{aligned} \cos x + 0.6 &= 0 \\ \cos x &= -0.6 \\ x &= \cos^{-1}(-0.6) \\ &\approx 2.21, 2\pi - 2.21 \\ &\approx 2.21 \text{ or } 4.07 \end{aligned}$$



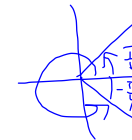
**Example #2:** Determine exact solutions for each equation in the interval  $x \in [0, 2\pi]$ .

a)  $\tan x + 1 = 0$



b)  $\sec x - \sqrt{2} = 0$

$$\begin{aligned} \sec x &= \sqrt{2} \\ \cos x &= \frac{1}{\sqrt{2}} \\ x &= \frac{\pi}{4}, \frac{7\pi}{4} \end{aligned}$$



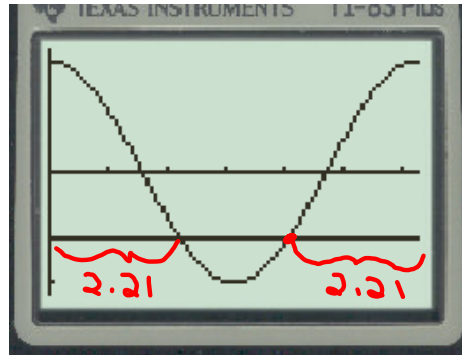
**Example #3:** Solve  $2 \sin^2 x - \sin x - 1 = 0$  on the interval  $x \in [0, 2\pi]$ , giving exact answers.

$$\begin{aligned} 2 \sin^2 x - \sin x - 1 &= 0 \\ (2 \sin x + 1)(\sin x - 1) &= 0 \\ \text{So: } \sin x &= -\frac{1}{2} \text{ or } \sin x = 1 \\ x &= \frac{7\pi}{6}, \frac{11\pi}{6} \quad x = \frac{\pi}{2} \end{aligned}$$

$$\begin{aligned} 2a^2 - a - 1 &= 0 \\ (2a + 1)(a - 1) &= 0 \\ a &= -\frac{1}{2} \text{ or } a = 1 \end{aligned}$$



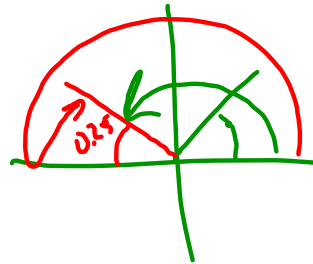
Homework: pg 287; #(1, 3, 5, 7)odd, 9, 10, 13a, 14 - 18, 20, 24



$2\pi - 2.21$

$$\sin x = \frac{1}{4}$$

$$x = 0.25, \pi - 0.25$$

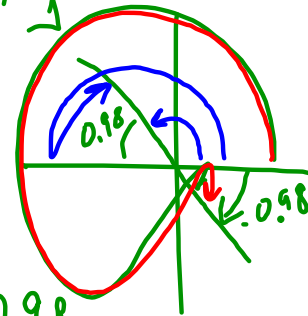


$$\cos x = -\frac{2}{3} \quad [0, 2\pi]$$

$$\tan x = -\frac{3}{2}$$

$$(x = -0.98)$$

$$x = \pi - 0.98, 2\pi - 0.98$$



$$\tan x = 5$$
$$x = 1.37$$

