

Section 4.4 Trig. Equations

pg. 207

ex. 1) $5\sin\theta + 2 = 1 + 3\sin\theta$

where $0 \leq \theta < 2\pi$

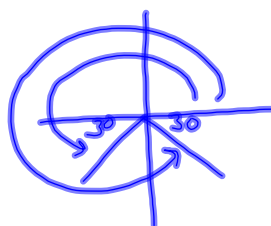
$$2\sin\theta + 1 = 0$$

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

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

$$\sin^{-1}\left(\frac{1}{2}\right) = 30^\circ$$

$$\theta = 210^\circ \text{ or } 330^\circ$$



* because restriction given in radians, give answer in radians.

$$\frac{210\pi}{180} = \frac{7\pi}{6}$$

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

$$\frac{330\pi}{180} = \frac{11\pi}{6}$$

b) $3\csc x - 6 = 0$, $0^\circ \leq \theta < 360^\circ$

$$3\csc x = 6$$

$$\csc x = 2$$

$$\frac{1}{\sin x} = \frac{2}{1} \quad \left(\begin{array}{l} 2\sin x = 1 \\ \sin x = \frac{1}{2} \end{array} \right)$$

$$\sin x = \frac{1}{2}$$

$$\sin^{-1}\left(\frac{1}{2}\right) = 30^\circ \text{ ref}$$

$$\theta = 30^\circ \text{ or } 150^\circ$$

ex. 2 pg. 208

$$\tan^2 \theta - 5 \tan \theta + 4 = 0, \quad 0 \leq \theta < 2\pi$$

$$\text{let } x = \tan \theta$$

$$x^2 - 5x + 4 = 0$$

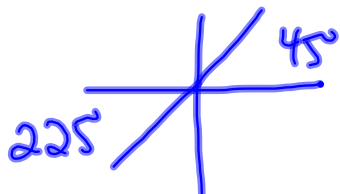
$$\begin{array}{l} \text{add} \rightarrow -5 \\ \text{mult} \rightarrow 4 \\ \hline -1 \quad -4 \end{array}$$

$$(x-1)(x-4) = 0$$

$$x=1 \quad \left\{ \begin{array}{l} x=4 \end{array} \right.$$

$$\tan \theta = 1$$

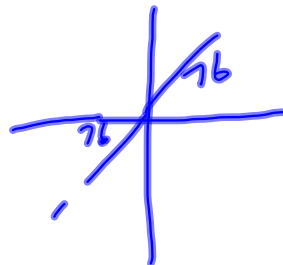
$$\tan^{-1}(1) = 45^\circ$$



$$\theta = \frac{\pi}{4}, \frac{5\pi}{4}$$

$$\tan \theta = 4$$

$$\tan^{-1}(4) \approx 76^\circ$$



$$\theta = 76^\circ + 256^\circ$$

$$\begin{aligned} &= \frac{76\pi}{180} & &= \frac{256\pi}{180} \\ &= \frac{19\pi}{45} & &= \frac{64\pi}{45} \\ &= \frac{19(3.14)}{45} \\ &= 1.325 \end{aligned}$$

ex.3 pg. 209

a) $\sin^2 x - 1 = 0$, $0 \leq x < 2\pi$

let $m = \sin x$

$m^2 - 1 = 0$

$(m-1)(m+1) = 0$

* Difference of Squares

$(\sin x - 1)(\sin x + 1) = 0$

$\sin x = 1$ $\sin x = -1$

$x = 90^\circ$

$x = 270^\circ$

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

$x = \frac{3\pi}{2}$

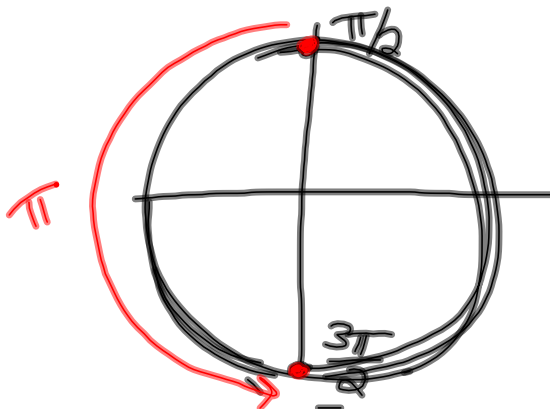
b) all general solutions

$x = \frac{\pi}{2} + 2\pi n, n \in \mathbb{I}$ or $\frac{\pi}{2} \pm 2\pi n, n \in \mathbb{N}$

and

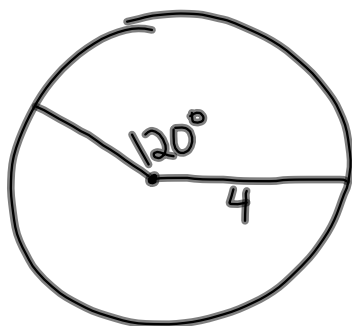
$x = \frac{3\pi}{2} + 2\pi n, n \in \mathbb{I}$

Together: $x = \frac{\pi}{2} + \pi n, n \in \mathbb{I}$



Assignment

7a)



b)

