

Section 9.4

1) $2 \cos^2 \theta - 3 \cos \theta = 0$ (Let $\theta = \frac{\pi}{2}$) $\rightarrow$
 $2 \cos^2(\frac{\pi}{2}) - 3 \cos(\frac{\pi}{2}) = 2(0)^2 - 3(0) = 0$ YES

2) $\frac{\sqrt{3}}{3} \cos 2x + \sin 2x = 1$ (Let $x = 15^\circ$) $\rightarrow$
 $\frac{\sqrt{3}}{3} \cos 30^\circ + \sin 30^\circ = \frac{\sqrt{3}}{3} \cdot \frac{\sqrt{3}}{2} + \frac{1}{2} = \frac{1}{2} + \frac{1}{2} = 1$ YES

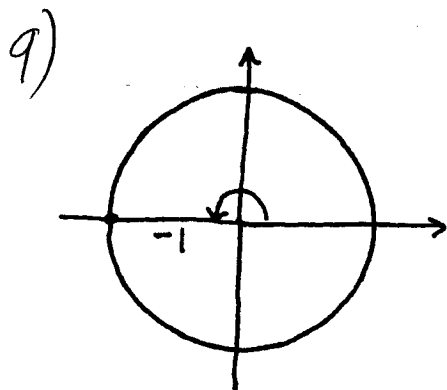
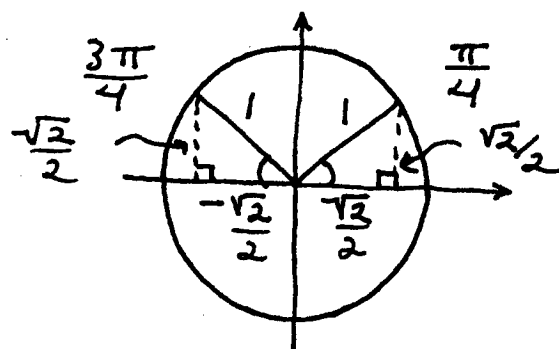
3) $\tan^2 x - 3 \tan x + 2 = 0$ (Let $x = \frac{3}{4}\pi$) $\rightarrow$
 $\tan^2(\frac{3}{4}\pi) - 3 \tan(\frac{3}{4}\pi) + 2 = (-1)^2 - 3(-1) + 2 = 6 \neq 0$ NO

4) $2 \sin t + 2 \cos t = \sqrt{3} - 1$ (Let $t = \frac{2}{3}\pi$) $\rightarrow$
 $2 \sin(\frac{2}{3}\pi) + 2 \cos(\frac{2}{3}\pi) = 2 \cdot \frac{\sqrt{3}}{2} + 2 \cdot \frac{-1}{2} = \sqrt{3} - 1$ YES

6) $\sin \theta = \frac{\sqrt{2}}{2} \rightarrow$

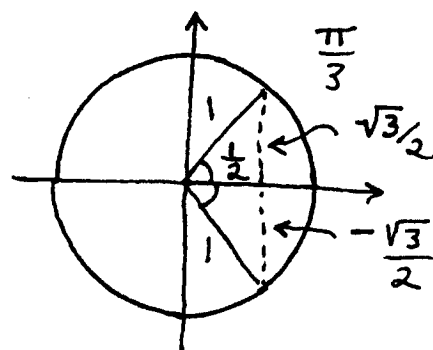
$\theta = \frac{\pi}{4}$ or

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



$\cos \theta = -1 \rightarrow \theta = \pi$

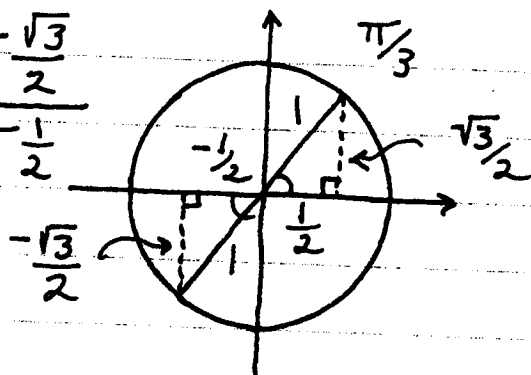
10) $\cos \theta = \frac{1}{2} \rightarrow \theta = \frac{\pi}{3}$ or
 $\theta = 2\pi - \frac{\pi}{3} = \frac{5\pi}{3}$



$$11) \tan \theta = \sqrt{3} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \frac{-\frac{\sqrt{3}}{2}}{-\frac{1}{2}}$$

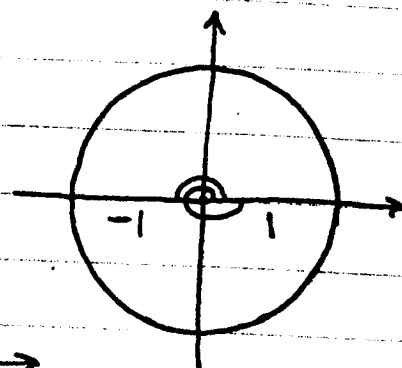
$$\rightarrow \theta = \frac{\pi}{3} \text{ or}$$

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



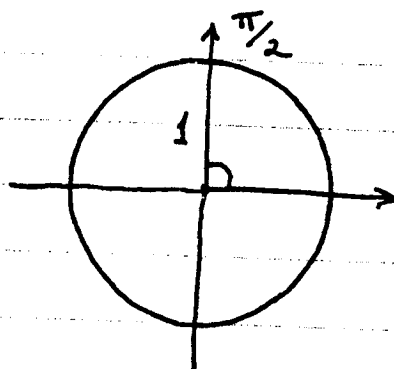
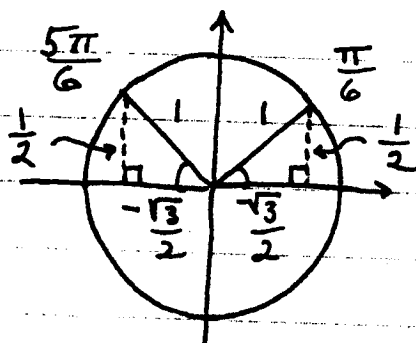
$$13) \tan x = 0 = \frac{0}{1} = \frac{0}{-1} \rightarrow$$

$$x = 0, \pi, \text{ or } 2\pi$$



$$14) 2 \sin^2 x - 3 \sin x + 1 = 0 \rightarrow$$

$$(2 \sin x - 1)(\sin x - 1) = 0 \rightarrow \sin x = \frac{1}{2} \text{ or } \sin x = 1 \rightarrow$$

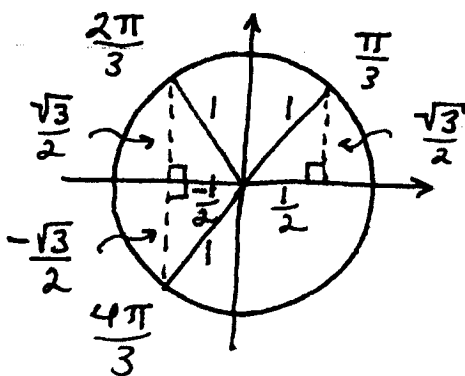
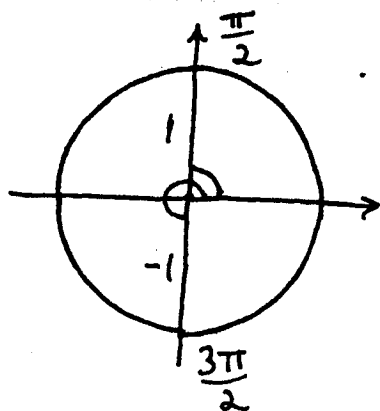


$$x = \frac{\pi}{6}, \frac{5\pi}{6} \text{ or}$$

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

$$15) 2 \cos^2 \theta + \cos \theta = 0 \rightarrow$$

$$\cos \theta (2 \cos \theta + 1) = 0 \rightarrow \cos \theta = 0 \text{ or } \cos \theta = -\frac{1}{2} \rightarrow$$



$$\theta = \frac{\pi}{2}, \frac{3\pi}{2} \text{ or}$$

$$\theta = \frac{2}{3}\pi, \frac{4}{3}\pi$$

$$16) \sin^2 x - \sin x - 6 = 0 \rightarrow$$

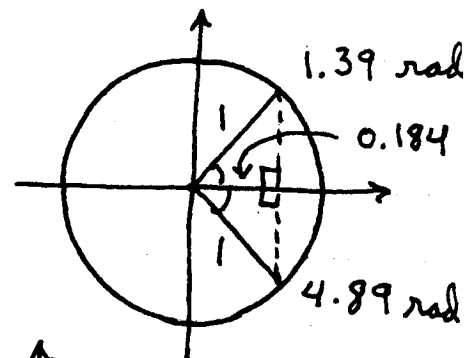
$$(\sin x - 3)(\sin x + 2) = 0 \rightarrow \sin x = 3$$

(impossible) or $\sin x = -2$ (impossible)

$$25) \cos x = 0.184 \rightarrow$$

$$x = \cos^{-1}(0.184) \approx 1.39 \text{ rad.}$$

$$\text{or } x = 2\pi - 1.39 \approx 4.89 \text{ rad.}$$

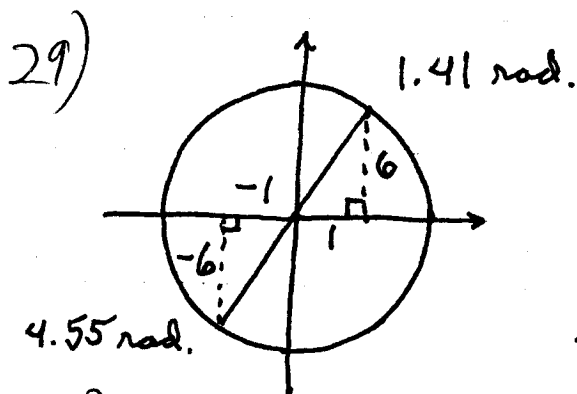
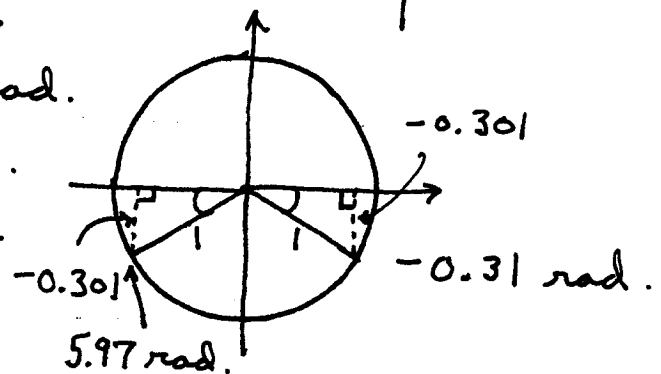


$$28) \sin t = -0.301 \rightarrow$$

$$t = \sin^{-1}(-0.301) \approx -0.31 \text{ rad.}$$

$$\text{so } t = \pi + 0.31 = 3.45 \text{ rad.}$$

$$\text{or } t = 2\pi - 0.31 = 5.97 \text{ rad.}$$



$$\tan x = 6 \rightarrow$$

$$x = \tan^{-1} 6 \approx 1.41 \text{ rad.}$$

or

$$x = \pi + 1.41 \approx 4.55 \text{ rad.}$$

$$35) \tan^2 x + \tan x - 12 = 0 \rightarrow$$

$$(\tan x - 3)(\tan x + 4) = 0 \rightarrow \tan x = 3 \text{ or } \tan x = -4 \rightarrow$$

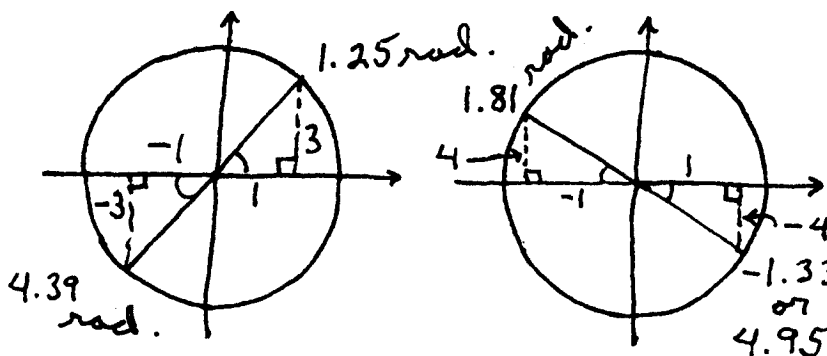
$$x = \tan^{-1} 3 \approx 1.25 \text{ rad. or}$$

$$x = \pi + 1.25 \approx 4.39 \text{ rad. ;}$$

$$x = \tan^{-1}(-4) \approx -1.33 \text{ rad.} \rightarrow$$

$$x = 2\pi - 1.33 \approx 4.95 \text{ rad. or}$$

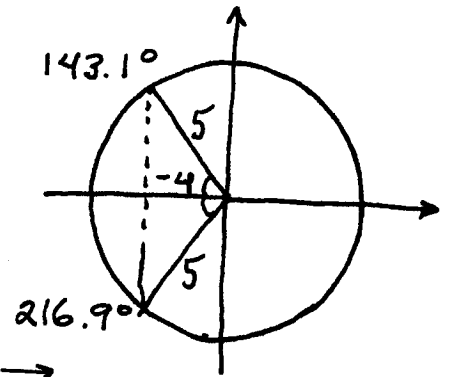
$$x = \pi - 1.33 \approx 1.81 \text{ rad.}$$



40) $\cos 2\theta = -4/5 \rightarrow$

$\theta = \cos^{-1}(-4/5) \approx 143.1^\circ$ or

$\theta = 360^\circ - 143.1^\circ = 216.9^\circ$



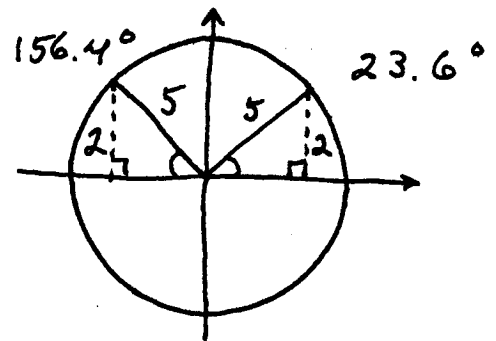
42) $5\sin^2\theta + 13\sin\theta - 6 = 0 \rightarrow$

$(5\sin\theta - 2)(\sin\theta + 3) = 0 \rightarrow$

$\sin\theta = 2/5$ or $\sin\theta = -3$ (impossible) $\rightarrow$

$\theta = \sin^{-1}(2/5) \approx 23.6^\circ$ or

$\theta = 180^\circ - 23.6^\circ = 156.4^\circ$



50) $2\sin^2\theta - \cos 2\theta = 0 \rightarrow$

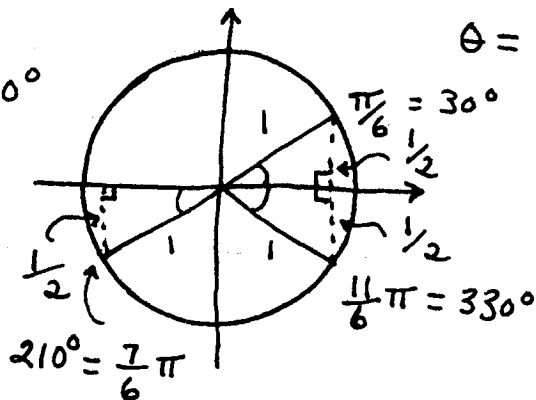
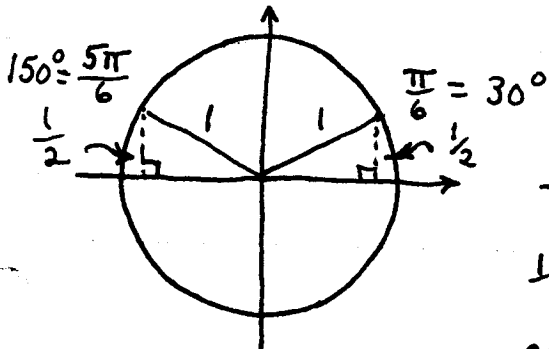
$2\sin^2\theta - (1 - 2\sin^2\theta) = 0 \rightarrow$

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

$4\sin^2\theta = 1 \rightarrow \sin^2\theta = 1/4 \rightarrow \sin^2\theta = \pm 1/2 \rightarrow$

$\theta = 30^\circ, 150^\circ$ or

$\theta = 210^\circ, 330^\circ$



49)

$\sin 2\theta = -2\cos\theta \rightarrow 2\sin\theta\cos\theta = -2\cos\theta$
 $\rightarrow 2\sin\theta\cos\theta + 2\cos\theta = 0 \rightarrow$

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

$\theta = 90^\circ, 270^\circ$ or $\theta = 270^\circ$