

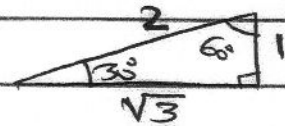
## Section 7.7

D. ZABDARZ

-1-

#10)

$$\overline{\tan^2 \theta} = \frac{1}{3}$$



$$\Rightarrow \overline{\tan \theta} = \pm \sqrt{\frac{1}{3}} = \pm \frac{\sqrt{3}}{3}$$

a)

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

$$\Rightarrow \theta = -\frac{\pi}{6}, \text{ but } 0 \leq \theta < 2\pi$$

$$\Rightarrow \theta = -\frac{\pi}{6} + \pi = \frac{5\pi}{6}, \text{ and } \theta = \frac{5\pi}{6} + \pi = \frac{11\pi}{6}$$

b)

$$\overline{\tan \theta} = \frac{\sqrt{3}}{3} \Rightarrow \theta = \frac{\pi}{6} \text{ and } \theta = \frac{\pi}{6} + \pi = \frac{7\pi}{6}$$

$$\text{A sol. set} = \left\{ \frac{5\pi}{6}, \frac{11\pi}{6}, \frac{\pi}{6}, \frac{7\pi}{6} \right\}$$

#19)

$$\overline{\cos(2\theta)} = -\frac{1}{2}$$

$$\Rightarrow 2\cos^2 \theta - 1 = -\frac{1}{2}$$

$$\overline{\cos^2 \theta} = \frac{1}{4}$$

$$\Rightarrow \overline{\cos \theta} = \pm \frac{1}{2}$$

a)

$$\overline{\cos \theta} = -\frac{1}{2}$$

$\Rightarrow \theta$  is either in QII or QIII

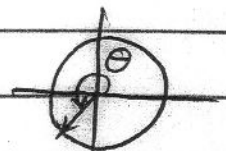
QII



$$\pi - \theta = \pi/3$$

$$\theta = \pi - \pi/3 = 2\pi/3$$

QIII



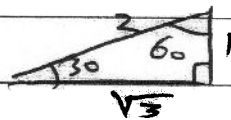
$$\theta - \pi = \pi/3$$

$$\theta = \pi + \pi/3 = 4\pi/3$$

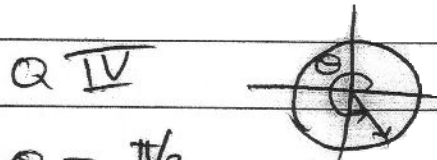
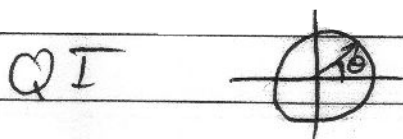
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Continue # 15



b)  $\cos \theta = 1/2$   
 $\Rightarrow \theta$  is either in QI or QIV



$\cos \theta = 1/2$   
 $\Rightarrow \theta = \pi/3$

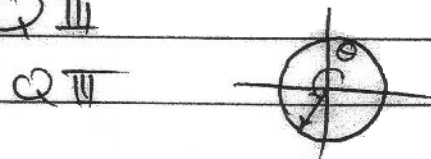
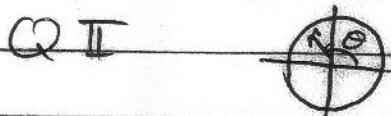
$2\pi - \theta = \pi/3$   
 $\theta = 2\pi - \pi/3 = 5\pi/3$

$\therefore$  Sol. Set =  $\{ 2\pi/3, 4\pi/3, \pi/3, 5\pi/3 \}$

20)  $\cos \theta + 1 = 0$   
 $\Rightarrow \cos \theta = -1$   
 $\Rightarrow \theta = \pi$

25)  $3\sqrt{2} \cos \theta + 2 = -1$   
 $3\sqrt{2} \cos \theta = -3$   
 $\cos \theta = \frac{-3}{3\sqrt{2}} = -\frac{\sqrt{2}}{2}$

$\Rightarrow \theta$  is either in QII or QIII



$\pi - \theta = \pi/4$

$\theta - \pi = \pi/4$

$\theta = \pi - \pi/4 = 3\pi/4$

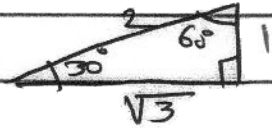
$\theta = \pi + \pi/4 = 5\pi/4$

$\therefore$  Sol. Set =  $\{ 3\pi/4, 5\pi/4 \}$

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Dr. ZABDANE

#30)  $\cos\left(\frac{\theta}{3} - \frac{\pi}{4}\right) = \frac{1}{2}$



Q I

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

$$\Rightarrow \frac{\theta}{3} = \frac{\pi}{4} + \frac{\pi}{3} = \frac{7\pi}{12}$$

$$\theta = \frac{7\pi}{4}$$

Q IV:

$$2\pi - \left(\frac{\theta}{3} - \frac{\pi}{4}\right) = \frac{\pi}{3}$$

$$2\pi - \frac{\theta}{3} + \frac{\pi}{4} = \frac{\pi}{3}$$

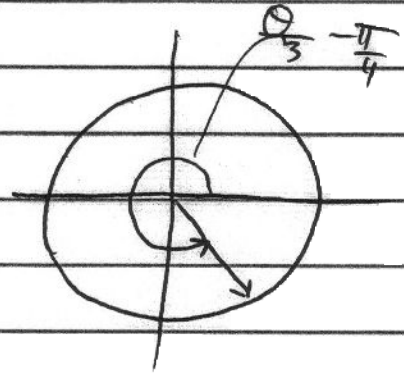
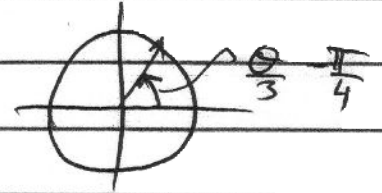
$$\frac{\theta}{3} = 2\pi + \frac{\pi}{4} - \frac{\pi}{3}$$

$$\frac{\theta}{3} = \frac{24\pi + 3\pi - 4\pi}{12} = \frac{23\pi}{12}$$

$$\Rightarrow \theta = \frac{23\pi}{4}$$

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

∴ sol. set  $\theta = \frac{7\pi}{4}$  only.



Section 7.7

Dr. BABDAR

#39)  $\cos \theta = 0$   
 $\Rightarrow \theta = \frac{\pi}{2} + 2k\pi \quad k = 0, 1, 2, 3, \dots$   
 OR  
 $\theta = \frac{3\pi}{2} + 2k\pi \quad k = 0, 1, 2, 3, \dots$

Let us list the first six solutions

$$\theta = \left\{ \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \frac{7\pi}{2}, \frac{9\pi}{2}, \frac{11\pi}{2} \right\}$$

#40)  $\overline{\cos \theta} = 1$

$$\Rightarrow \frac{\theta}{2} = \frac{\pi}{4} \quad \text{or} \quad -\frac{\pi}{4} + \pi = \frac{3\pi}{4}$$

General Solution  $\frac{\theta}{2} = \frac{3\pi}{4} + k\pi \quad ; \quad k = 0, 1, 2, 3, \dots$

$$\Rightarrow \theta = \frac{3\pi}{2} + 2k\pi \quad ; \quad k = 0, 1, 2, 3, \dots$$

Let us list the first six solutions :  $k = 0, 1, 2, 3, 4, 5$

$$\theta = \left\{ \frac{3\pi}{2}, \frac{7\pi}{2}, \frac{11\pi}{2}, \frac{15\pi}{2}, \frac{19\pi}{2}, \frac{23\pi}{2} \right\}$$