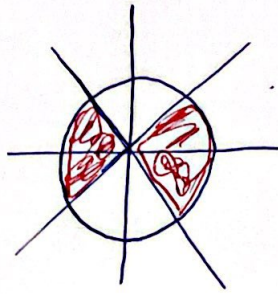


24] $-\frac{\pi}{4} \leq \theta \leq \frac{\pi}{4}$ $-1 \leq r \leq 1$

11.3



37] $r = \frac{5}{\sin \theta - 2 \cos \theta}$

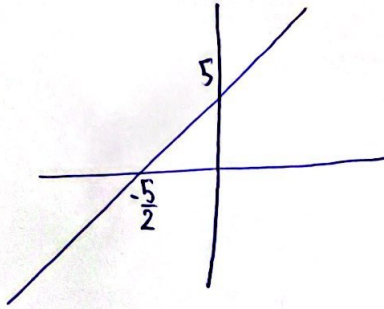
$$r \sin \theta - 2r \cos \theta = 5$$

$$y - 2x = 5$$

$$\boxed{y = 5 + 2x}$$

$$m = 2$$

$$y = 0 \rightarrow x = -\frac{5}{2}$$



60] $xy = 2$

$$r \cos \theta r \sin \theta = 2$$

$$2x (r^2 \sin \theta \cos \theta = 2)$$

$$r^2 \sin 2\theta = 4$$

i) a. $(3, 0) =$ e. $(-3, \pi)$

b. $(-3, 0) =$ g. $(-3, 2\pi)$

c. $(2, \frac{2\pi}{3}) =$ h. $(-2, -\frac{\pi}{3})$

d. $(2, \frac{7\pi}{3}) =$ f. $(2, \frac{\pi}{3})$

Haytham
Shehadeh

a- $(\sqrt{2}, \frac{\pi}{4})$

$$(r, \theta) \rightarrow \begin{aligned} x &= r \cos \theta \\ y &= r \sin \theta \end{aligned}$$

1) $x = \sqrt{2} \cos \frac{\pi}{4} = 1$

$(1, 1)$

$y = \sqrt{2} \sin \frac{\pi}{4} = 1$

b- $(1, 0)$

$x = 1 \cos 0 = 1$ $(1, 0)$

$y = 1 \sin 0 = 0$

c- $(0, \frac{\pi}{2})$

$x = 0 \cos \frac{\pi}{2} = 0$ $(0, 0)$

$y = 0 \sin \frac{\pi}{2} = 0$

d- $(-\sqrt{2}, \frac{\pi}{4})$

$x = -\sqrt{2} \cos \frac{\pi}{4} = -1$ $(-1, -1)$

$y = -\sqrt{2} \sin \frac{\pi}{4} = -1$

e- $(-3, \frac{5\pi}{6})$

$x = -3 \cos \frac{5\pi}{6} = \frac{3\sqrt{3}}{2}$ $(\frac{3\sqrt{3}}{2}, -\frac{3}{2})$

$y = -3 \sin \frac{5\pi}{6} = -\frac{3}{2}$

f- $(5, \tan^{-1}(\frac{4}{3}))$

$x = 5 \cos(\tan^{-1} \frac{4}{3})$

$y = 5 \sin(\tan^{-1} \frac{4}{3})$

$\tan \theta = \frac{y}{x}$

$\tan^{-1}(\frac{y}{x}) = \theta$

$x = 3$ $(3, 4)$

$y = 4$

g. $(-1, 7\pi)$

$$x = -1 \cos 7\pi = 1 \quad (1, 0)$$

$$y = -1 \sin 7\pi = 0$$

h. $(2\sqrt{3}, \frac{2\pi}{3})$

$$x = 2\sqrt{3} \cos \frac{2\pi}{3} = -\sqrt{3} \quad (-\sqrt{3}, 3)$$

$$y = 2\sqrt{3} \sin \frac{2\pi}{3} = 3$$

7) $0 \leq \theta < 2\pi \quad r \geq 0$

a. $(1, 1)$

$$r^2 = 1+1$$

$$r^2 = 2$$

$$r = \sqrt{2}$$

$$\sin \theta = \frac{1}{\sqrt{2}} \rightarrow \theta = \frac{\pi}{4}$$

$$\begin{aligned} x &= r \cos \theta \\ y &= r \sin \theta \\ x^2 + y^2 &= r^2 \end{aligned}$$

$$(\sqrt{2}, \frac{\pi}{4})$$

b. $(-3, 0)$

$$r^2 = 9+0$$

$$r = 3$$

$$\begin{aligned} \sin \theta &= 0 \\ \cos \theta &= -1 \end{aligned} \rightarrow \theta = \pi$$

$$(3, \pi)$$

c. $(-\sqrt{3}, -1)$

$$r^2 = 3+1$$

$$r^2 = 4$$

$$r = 2$$

$$\begin{aligned} \sin \theta &= -\frac{1}{2} \\ \cos \theta &= -\frac{\sqrt{3}}{2} \end{aligned} \rightarrow \theta = \frac{11\pi}{6}$$

$$(2, \frac{11\pi}{6})$$

$$(-3, 4)$$

$$r^2 = 9 + 16$$

$$r = 5$$

$$\sin \theta = \frac{4}{5}$$

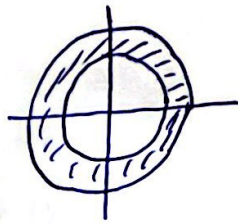
$$\cos \theta = -\frac{3}{5}$$

$$\theta = \pi - \tan^{-1}\left(\frac{4}{3}\right)$$

$$\left(5, \pi - \tan^{-1}\left(\frac{4}{3}\right)\right)$$

14)

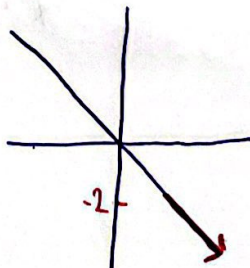
$$1 \leq r \leq 2$$



16)

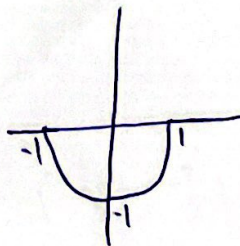
$$\theta = \frac{2\pi}{3}$$

$$r \leq -2$$



22)

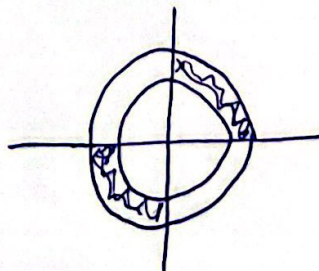
$$0 \leq \theta \leq \pi, r = -1$$



26)

$$0 \leq \theta \leq \frac{\pi}{2}$$

$$1 \leq |r| \leq 2$$

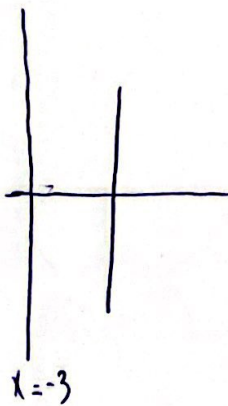


32) $r = -3 \sec \theta$

$$r = \frac{-3}{\cos \theta}$$

$$r \cos \theta = -3$$

$$x = -3$$



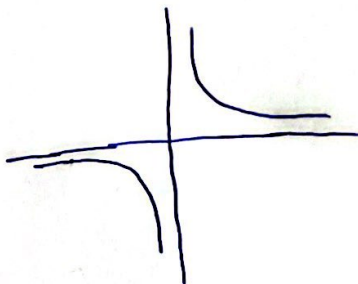
38) $r^2 \sin 2\theta = 2$

$$2 r^2 \cos \theta \sin \theta = 2$$

$$r \cos \theta r \sin \theta = 1$$

$$y x = 1$$

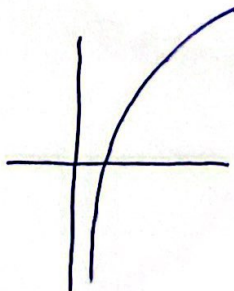
$$y = \frac{1}{x}$$



42) $r \sin \theta = \ln r + \ln \cos \theta$

$$y = \ln r \cos \theta$$

$$y = \ln x$$



52) $r \sin \left(\frac{2\pi}{3} - \theta \right) = 5$

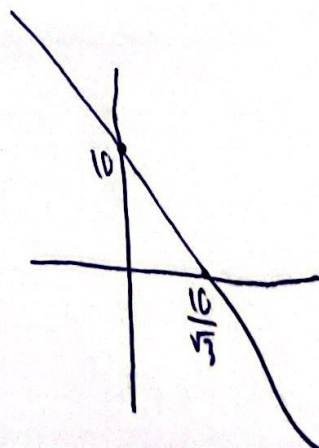
$$r \left(\sin \left(\frac{2\pi}{3} \right) \cos \theta - \sin \theta \cos \left(\frac{2\pi}{3} \right) \right) = 5$$

$$r \left(\frac{\sqrt{3}}{2} \cos \theta + \frac{1}{2} \sin \theta \right) = 5$$

$$\frac{\sqrt{3}}{2} r \cos \theta + \frac{1}{2} r \sin \theta = 5$$

$$\frac{\sqrt{3}}{2} x + \frac{1}{2} y = 5$$

$$\boxed{y = 10 - \sqrt{3}x}$$



(2) $x^2 + xy + y^2 = 1$

$$r^2 + r \cos \theta r \sin \theta = 1$$

$$r^2 + r^2 \cos \theta \sin \theta = 1$$

$$r^2 [1 + \cos \theta \sin \theta] = 1$$

$$r^2 \left[1 + \frac{1}{2} \sin 2\theta \right] = 1$$