ASSIGNMENT # 02

Q9

a) $r = 2$

$\because r = \sqrt{x^2+y^2}$

$\sqrt{x^2+y^2} = 2$

$\boxed{x^2+y^2 = 4}$

b) $r\sin\theta = 4$

$\because y = r\sin\theta$

$y = 4$

c) $r = 3\cos\theta$

Multiply r on bs

$r^2 = 3r\cos\theta$

$\because r^2 = x^2 + y^2$

$r\cos\theta = x$

$\boxed{x^2+y^2 = 3x}$

d) $r = \dfrac{6}{3\cos\theta + 2\sin\theta}$

$3r\cos\theta + 2r\sin\theta = 6$

$\because x = r\cos\theta$

$\because y = r\sin\theta$

$\boxed{3x + 2y = 6}$

Q12 Q11

a) ~~$y = 3$~~ $x = 3$

$\because x = r\cos\theta$

$\boxed{r\cos\theta = 3}$

b) $x^2 + y^2 = 7$

$\because r^2 = x^2 + y^2$

$r^2 = 7$

$\boxed{r = \sqrt{7}}$

c) $x^2 + y^2 + 6y = 0$

$\because r^2 = x^2 + y^2$

$\because y = r\sin\theta$

$r^2 + 6r\sin\theta = 0$

$\boxed{r = -6\sin\theta}$

d) $9xy = 4$

$\because x = r\cos\theta$

$y = r\sin\theta$

$9r^2\cos\theta\sin\theta = 4$

$$\boxed{r^2 = \sqrt{\frac{4}{9\cos\theta\sin\theta}}}$$

Q19

a) $r = 3\sin 2\theta$

) $r = 3 + 2\sin\theta$

) $r^2 = 3\cos 2\theta$

Q25

$r = 6\sin\theta$

θ	r
0	0
$\pi/6$	3
$\pi/3$	5.2
$\pi/2$	6
$2\pi/3$	5.2
$5\pi/6$	3
π	0

Q29

Q) $r = 4 - 4\cos\theta$

SYMMETRIC TEST :-

- For X-AXIS

$r = 4 - 4\cos(-\theta)$

$r = 4 - 4\cos\theta$

TRUE

- For y-axis

$r = 4 - 4\cos(\pi - \theta)$

$= 4 - 4[\cos\pi\cos\theta + \sin\pi\sin\theta]$ (cos π → −1, sin π → 0)

$r = 4 + 4\cos\theta$

False

θ	r
0	0
$\pi/6$	0.5
$\pi/3$	2
$\pi/2$	4
$2\pi/3$	6
$5\pi/6$	7.4
π	8

033

$r = 3 - \sin\theta$

Symmetric Test :-

For y-axis

$r = 3 - \sin(\pi - \theta)$

$= 3 - 3[\sin\pi\cos\theta - \sin\theta\cos\pi]$ (0, -1)

$r = 3 - \sin\theta$

TRUE

For x-axis

False because sine is odd function

θ	r
$\pi/2$	2
$2\pi/3$	2.1
$5\pi/6$	2.5
π	3
$7\pi/6$	3.5
$4\pi/3$	3.8
$3\pi/2$	4

Q87

$r = -3 - 4\sin\theta$

Symmetric Test :-

For x-axis :-

$r = -3 - 4\sin(-\theta)$

$r = -3 + 4\sin\theta$

False

For y-axis :-

$r = -3 - 4\sin(\pi - \theta)$

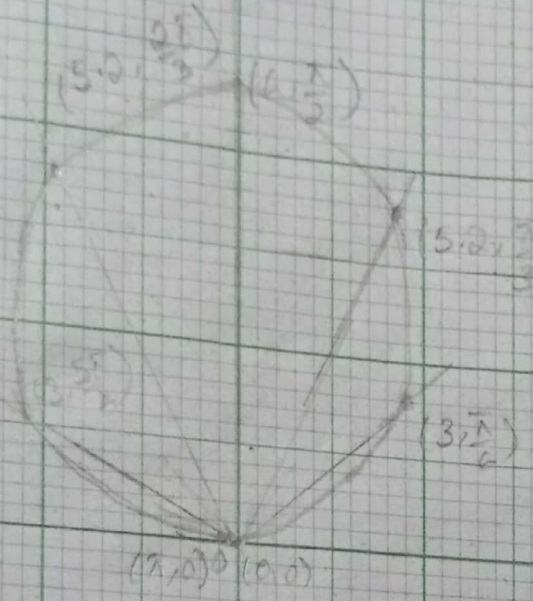
$= -3 - 4[\sin\pi\cos\theta - \cos\pi\sin\theta]$ (0, −1)

$r = -3 - 4\sin\theta$

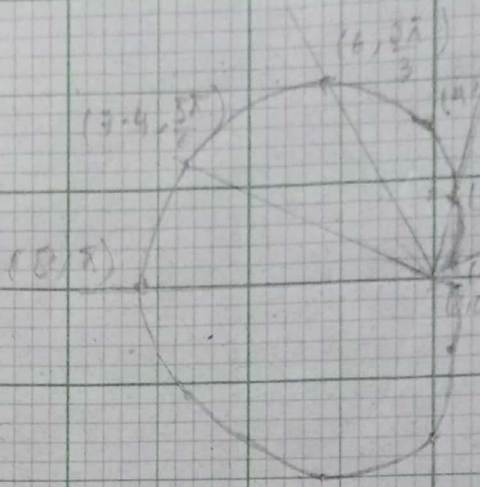
True

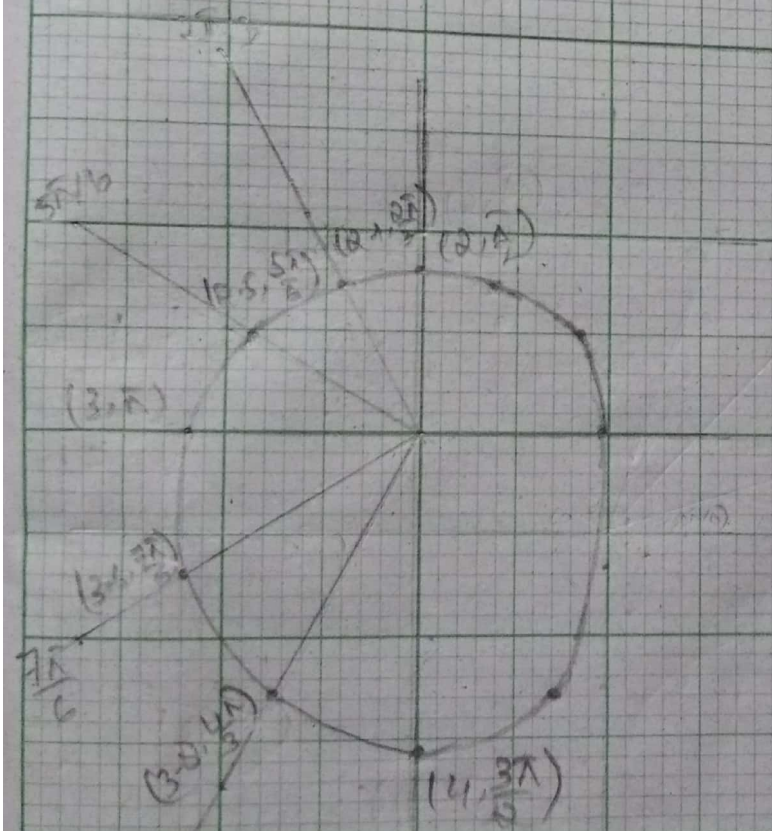
r	θ	r	θ
−7	π/2	0.4	5π/
−6.4	2π/3		
−5	5π/6	−1	π/
−3	π	−3	2π
−1	7π/6	−3	0
0.4	4π/3	−6.4	π/3
1	3π/2	−5	π/6

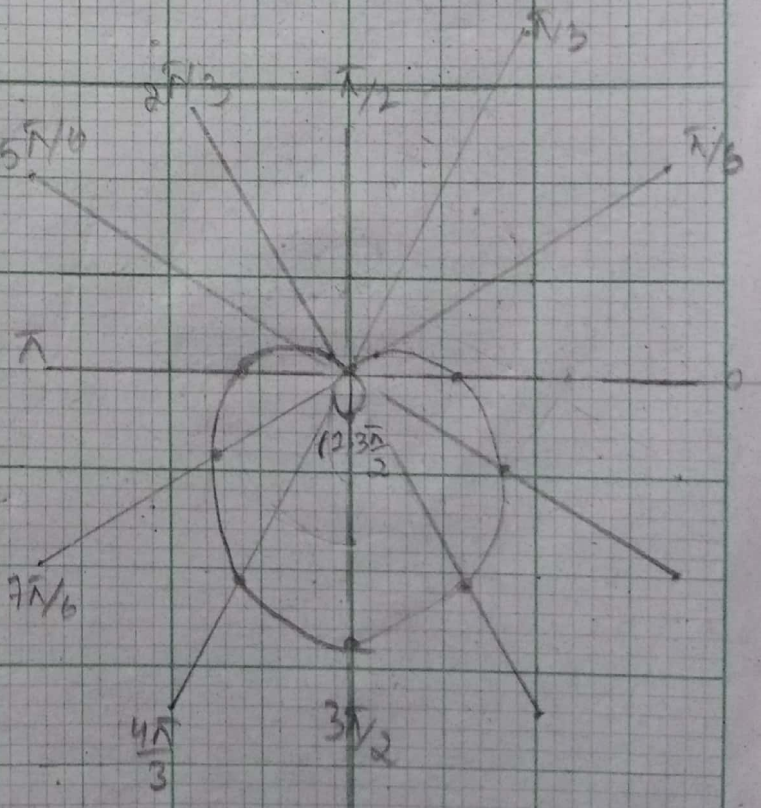
$r = 6\sin\theta$



$r = 4 - 4\cos\theta$







$r = 3 - \sin\theta$

Q39

$r^2 = 16 \sin 2\theta$

Symmetric Test

For x-axis

$r^2 = 16 \sin 2(-\theta)$

$r^2 = -16 \sin 2\theta$

False

For Pole

$r^2 = 16 \sin 2(\theta + \pi)$

$= 16[\sin 2\theta \cos 2\pi - \cos 2\theta \sin \pi]$

$r^2 = 16 \sin 2\theta$

TRUE

For y-axis:-

$r^2 = 16 \sin 2(\pi - \theta)$

$= 16 \sin(2\pi - 2\theta)$

$= 16[\sin 2\pi \cos 2\theta - \cos 2\pi \sin 2\theta]$

$r^2 = 16 \sin 2\theta$

Yes, TRUE.

r	θ
0	0
3.7	$\pi/6$
4	$\pi/4$
3.7	$\pi/3$
0	$\pi/2$
2.8	$\pi/12$
2.8	$5\pi/12$

Q41

$r = 4\theta$

θ	r
0	0
$\pi/4$	0.7
$\pi/2$	1.5
$3\pi/4$	2.3
π	3.1
$5\pi/4$	3.9
$3\pi/2$	4.7
$7\pi/4$	5.4
2π	6.2
$9\pi/4$	7.0
$5\pi/2$	7.8
$11\pi/4$	8.6
3π	9.42

Q45

$r = 9 \sin 4\theta$

Symmetric Test

For x-axis

$-r = 9\sin(4\pi - 4\theta)$

$-r = 9[\sin 4\pi \cos 4\theta - \cos 4\pi \sin 4\theta]$

$r = 9 \sin 4\theta$

TRUE

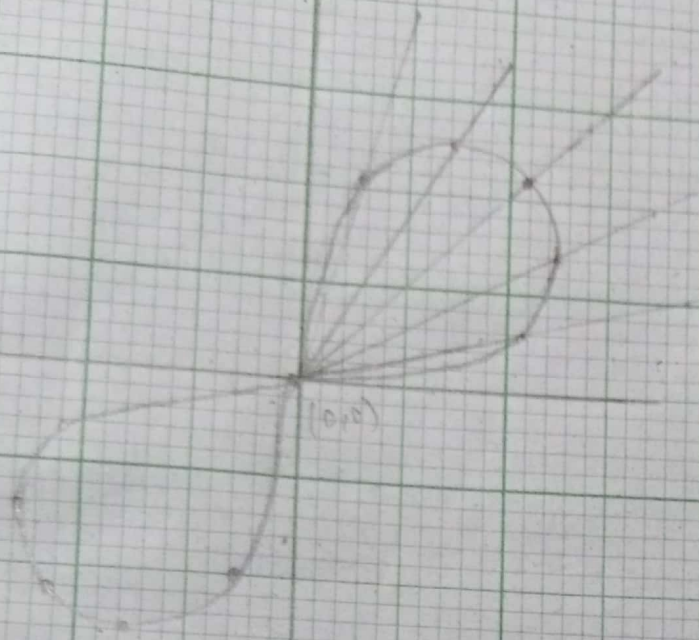
For y-axis

$-r = 9 \sin 4(-\theta)$

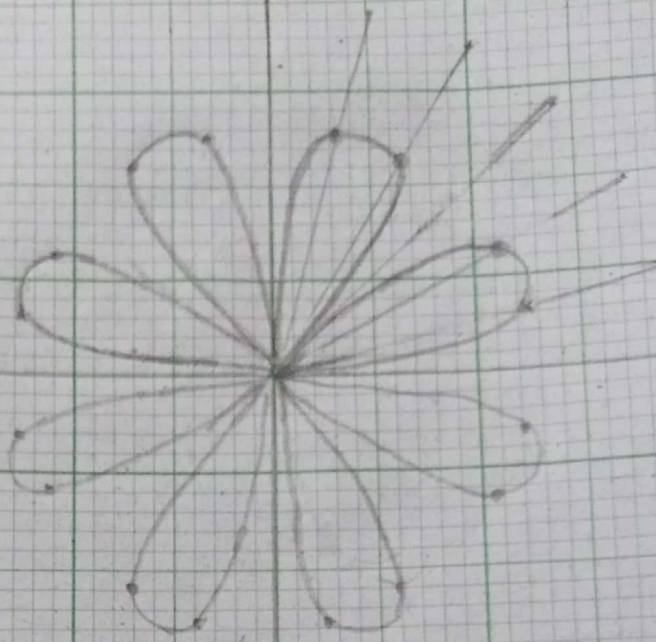
$r = 9 \sin 4\theta$

TRUE

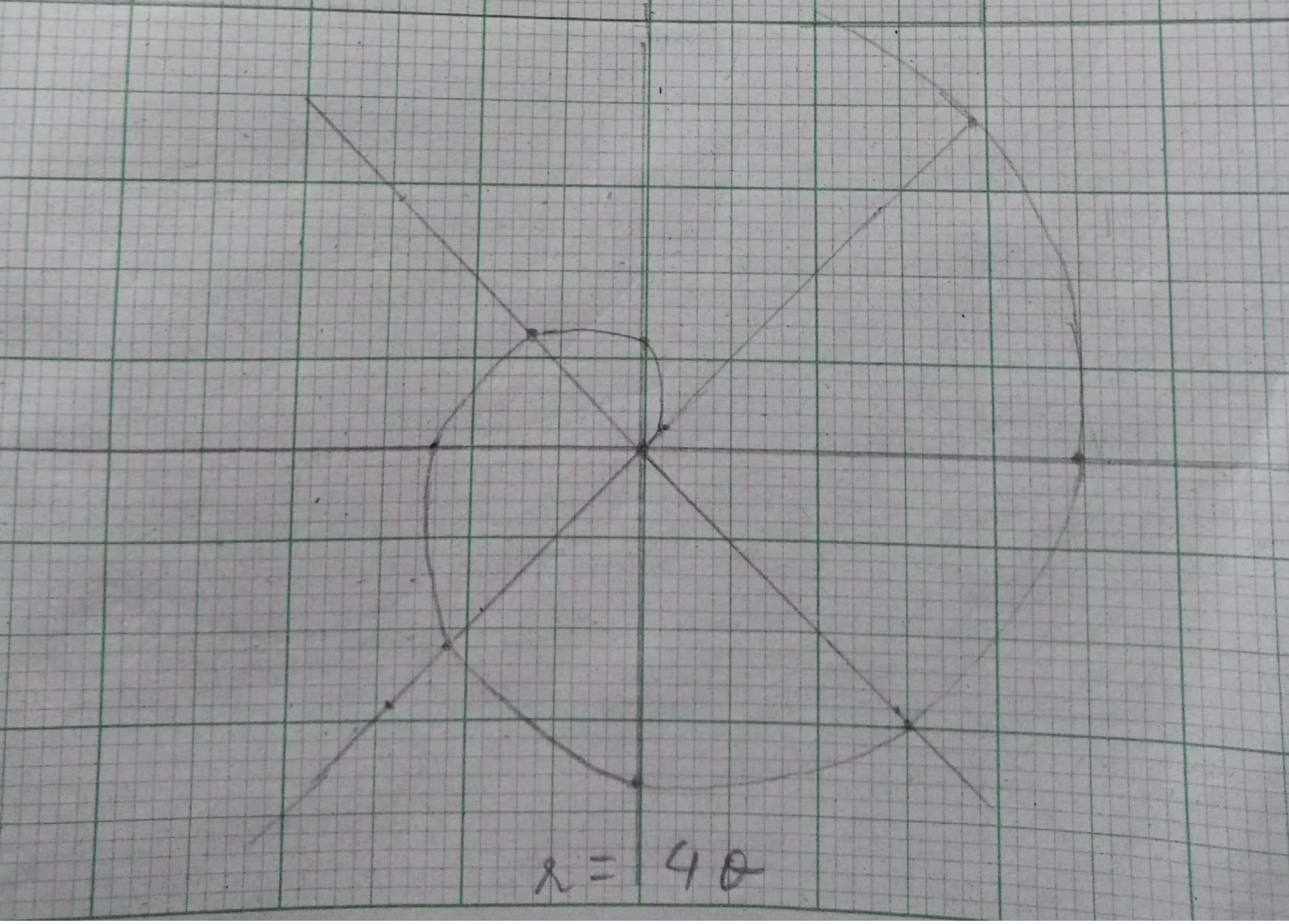
θ	r
0	0
$\pi/12$	7.7'
$\pi/6$	7.7
$\pi/4$	0
$\pi/3$	-7.7
$5\pi/12$	-7.7
$\pi/2$	0



$r^2 = 16\sin 2\theta$



$r = 9\sin 4\theta$



$r = 4\theta$