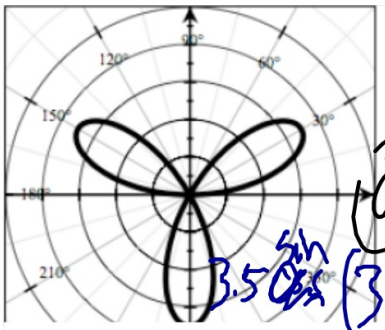
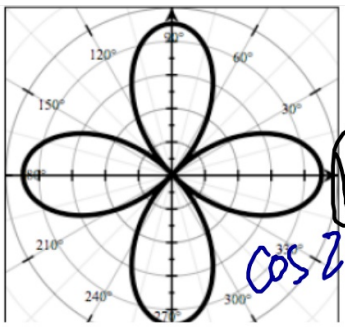


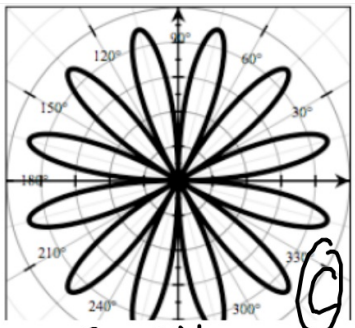
a

3.5 sin 3θ



b

cos 2θ

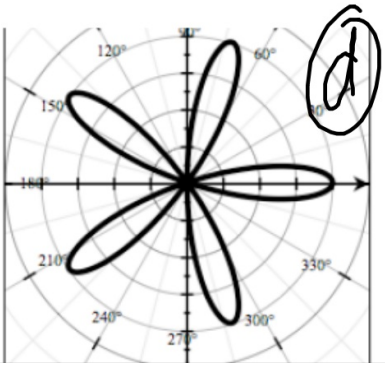


c

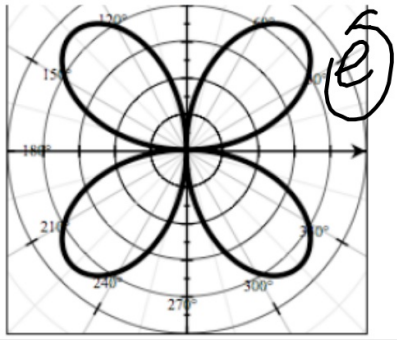
n the polar equations with their graphs below.

MATCH GRAPH

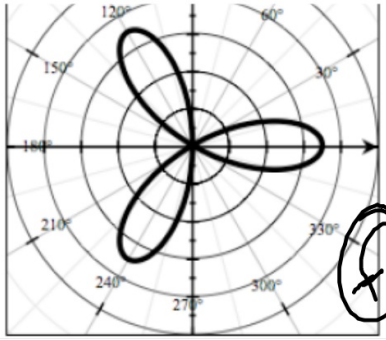
__1) $r = 2.5 + 2.5\sin\theta$	___2) $r = 3$	a 3) $r = 3.5\sin 3\theta$	c 4) $r = 4.5\sin 2\theta$
25) $r = 4.5\cos 2\theta$	___6) $r = 1.5 + 2\cos\theta$	___7) $r = -3\sin\theta$	___8) $r = 2 - \sin\theta$
__9) $r^2 = 16\sin 2\theta$	d 10) $r = 4\cos 5\theta$	f 11) $r = 3.5\cos 3\theta$	___12) $r = 2.5 - 2.5\cos\theta$
__13) $r = 3\cos\theta$	___14) $r = 1 + 4\sin\theta$	c 15) $r = 4.5\sin 6\theta$	___16) $r = .5\theta$



d



e



f

Page 548
9-12, 46, 48

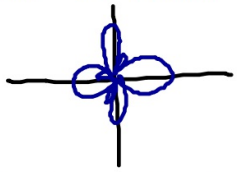
In Exercises 45–48, find the length of each petal of the polar curve.

45. $r = 2 + 4\sin 2\theta$

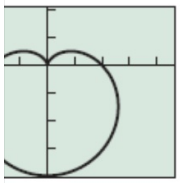
46. $r = 3 - 5\cos 2\theta$

47. $r = 1 - 4\cos 5\theta$

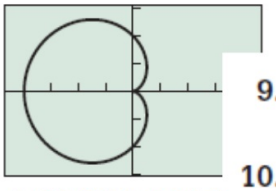
48. $r = 3 + 4\sin 5\theta$



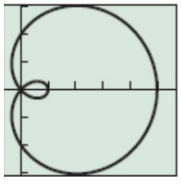
ises 9–12, match the equation with its graph without using
aphing calculator.



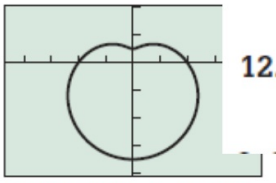
.7] by [–4.1, 2.1]
(a)



[–4.7, 4.7] by [–3.1, 3
(b)



.7] by [–3.1, 3.1]
(c)



[–4.7, 4.7] by [–4.1, 2.1]
(d)

9. Does the graph of $r = 2 + 2\sin\theta$ or $r = 2 - 2\cos\theta$ appear in the figure? Explain. Graph (b) is $r = 2 - 2\cos\theta$.

10. Does the graph of $r = 2 + 3\cos\theta$ or $r = 2 - 3\cos\theta$ appear in the figure? Explain. Graph (c) is $r = 2 + 3\cos\theta$.

11. Is the graph in (a) the graph of $r = 2 - 2\sin\theta$ or $r = 2 + 2\cos$ Explain. Graph (a) is $r = 2 - 2\sin\theta$.

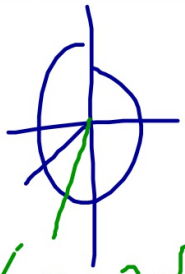
12. Is the graph in (d) the graph of $r = 2 + 1.5\cos\theta$ or $r = 2 - 1$. $\sin\theta$? Explain. Graph (d) is $r = 2 - 1.5\sin\theta$.

Convert from Polar to Rectangular coordinates

Find exact answer (no decimals)

1) (-3, 7π/6) $\left(-3\cos\frac{7\pi}{6}, -3\sin\frac{7\pi}{6}\right)$ $-3\left(-\frac{\sqrt{3}}{2}\right)\ \left(\frac{3\sqrt{3}}{2}, \frac{3}{2}\right)$

2) (4, 240°) $-3\left(\frac{-1}{2}\right)$



$(-2, -2\sqrt{3})$

Convert from Rectangular to Polar coordinates

Find the answer when r and θ are both positive and both negative $(+,+)$ $(-,-)$

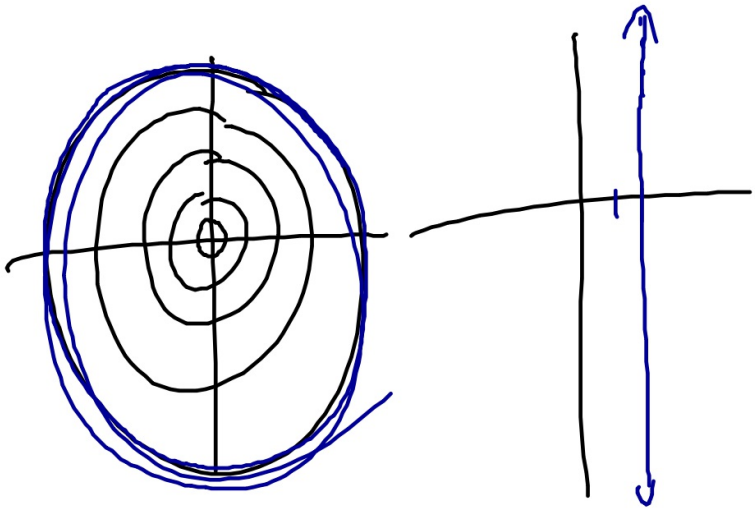
1) (-2, 6) $(2\sqrt{10}, 108.4)$ $(-2\sqrt{10}, -71.6)$

2) (-3, -9) $(3\sqrt{10}, 251.6)$ $(-3\sqrt{10}$

Analyzing graphs of r = and θ =

$r^2 = 5^2$

$x^2 + y^2 = 25$



Analyzing graphs of r = and θ =

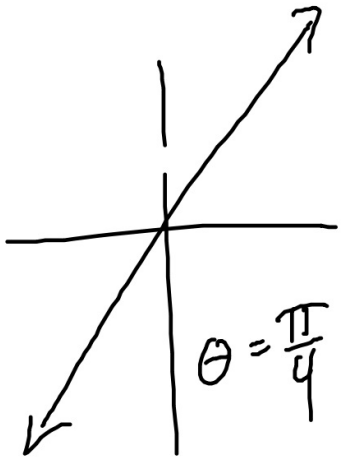
$y = x$

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

$\frac{r\sin\theta}{r\cos\theta} = 1$

$\tan\theta = 1$

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



Analyzing graphs of r = and θ =

θ = π/3

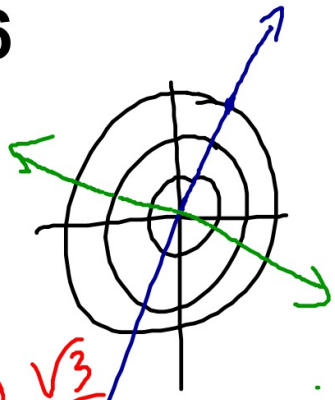
$y = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}}x$

$y = \sqrt{3}x$

θ = 5π/6

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

$\frac{1}{2} \times -\frac{2}{\sqrt{3}}$ $-\frac{1}{\sqrt{3}}$ $\frac{\sqrt{3}}{3}$



Converting Polar/Rectangular equations

$r = 4\sin\theta$

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

$x^2 + y^2 = 4y$

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

$x^2 + (y^2 - 4y + 4) = 0 + 4$

$x^2 + (y-2)^2 = 4$

$(0, 2)$ $r = 2$

Converting Polar/Rectangular equations

$r = 4\cos\theta + 8\sin\theta$

$r^2 = 4r\cos\theta + 8r\sin\theta$

$x^2 + y^2 = 4x + 8y$

$(x-2)^2 + (y-4)^2 = 20$

20 20 20

Converting Polar/Rectangular equations

1) θ = π/4

2) r = 6

$x^2 + y^2 = 36$

3) θ = π/6

$y = \frac{\sqrt{3}}{3}x$

$\frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}}$

4) r = 5cosθ

$(x-2.5)^2 + y^2 = 6.25$

5) r = 3secθ

$r = 3\frac{1}{\cos\theta}$

$x = 3 \quad r\cos\theta = 3$

6) $r = \frac{4}{(3\cos\theta + \sin\theta)}$

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

$3x + 1y = 4$

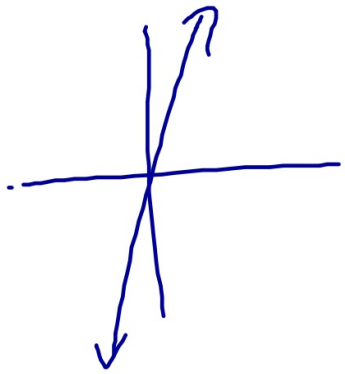
Converting Polar/Rectangular equations

y = √3 x

$\tan\theta = \sqrt{3}$

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

$\frac{y}{x} = \sqrt{3}$



$\sqrt{3}$

$\frac{\sqrt{3}}{3}$

1

Converting Polar/Rectangular equations

4x - 2y = 7

$4r\cos\theta - 2r\sin\theta = 7$

$r(4\cos\theta - 2\sin\theta) = 7$

$r = \dfrac{7\ (\text{seven})}{4\cos\theta - 2\sin\theta}$

Converting Polar/Rectangular equations

$(x - 4)^2 + (y + 1)^2 = 17$

$x^2 - 8x + 16 + y^2 + 2y + 1 = 17$

$x^2 - 8x + y^2 + 2y = 0$

$x^2 + y^2 = 8x - 2y$

$\dfrac{r^2}{r} = \dfrac{8r\cos\theta}{r} - \dfrac{2r\sin\theta}{r}$

$r = 8\cos\theta - 2\sin\theta$

In Exercises 35–42, convert the polar equation to rectangular form and identify the graph. Support your answer by graphing the polar equation.

35. $r = 3 \sec \theta$ **36.** $r = -2 \csc \theta$ **37.** $r = -3 \sin \theta$

38. $r = -4 \cos \theta$ **39.** $r \csc \theta = 1$ **40.** $r \sec \theta = 3$

41. $r = 2 \sin \theta - 4 \cos \theta$ **42.** $r = 4 \cos \theta - 4 \sin \theta$

In Exercises 43–50, convert the rectangular equation to polar form. Graph the polar equation.

43. $x = 2$ **44.** $x = 5$

45. $2x - 3y = 5$ **46.** $3x + 4y = 2$

47. $(x - 3)^2 + y^2 = 9$ **48.** $x^2 + (y - 1)^2 = 1$

49. $(x + 3)^2 + (y + 3)^2 = 18$ **50.** $(x - 1)^2 + (y + 4)^2 = 17$