Name: Key

9.3 Practice

Find the rectangular coordinates for each point with the given polar coordinates.

1. $(6, 120°)$ $(-3, 3\sqrt{3})$

$x = 6\cos 120° = 6\left(-\frac{1}{2}\right) = -3$ $\quad y = 6\sin 120° = 6\left(+\frac{\sqrt{3}}{2}\right) = 3\sqrt{3}$ match!

2. $(-4, 45°)$ $(-2\sqrt{2}, -2\sqrt{2})$

$x = -4\cos 45 = -4\left(\frac{\sqrt{2}}{2}\right) = -2\sqrt{2}$ $\quad y = -4\sin 45 = -2\sqrt{2}$ match!

3. $\left(4, \frac{\pi}{6}\right)$ $(2\sqrt{3}, 2)$

$x = 4\cos\frac{\pi}{6} = 4\left(\frac{\sqrt{3}}{2}\right) = 2\sqrt{3}$ $\quad y = 4\sin\frac{\pi}{6} = 4\left(\frac{1}{2}\right) = 2$ match!

Find two pairs of polar coordinates for each point with the given rectangular coordinates if $0 \le \theta < 2\pi$.

4. $(2, 2)$ $\tan\theta = 1$

$r = \pm\sqrt{8} = \pm 2\sqrt{2}$ $\quad \theta = \frac{\pi}{4}, \frac{5\pi}{4}$

$(2\sqrt{2}, \frac{\pi}{4}) + (-2\sqrt{2}, \frac{5\pi}{4})$

5. $(2, -3)$ $(\sqrt{13}, 5.3)$ $(-\sqrt{13}, 2.2)$

$r = \pm\sqrt{13}$ $\quad \tan\theta = \frac{-3}{2}$

$\theta = 304° + 124°$ or $5.3 + 2.2$

6. $(-3, \sqrt{3})$ $(2\sqrt{3}, \frac{5\pi}{6})$ $(-2\sqrt{3}, \frac{11\pi}{6})$

$r = \pm\sqrt{12} = \pm 2\sqrt{3}$ $\quad \tan\theta = \frac{\sqrt{3}}{-3}$ $\quad \theta = \frac{5\pi}{6} + \frac{11\pi}{6}$

Identify the graph of each rectangular equation. Then write the equation in polar form. Support your answer by graphing the polar form of the equation.

7. $x^2 + y^2 = 9$ circle!

$(r\cos\theta)^2 + (r\sin\theta)^2 = 9$

$r^2(\cos^2\theta + \sin^2\theta) = 9$ $\quad r^2 = 9$

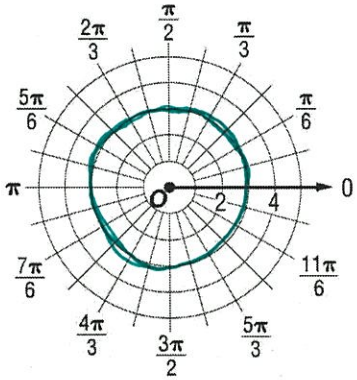
$r = \pm 3$

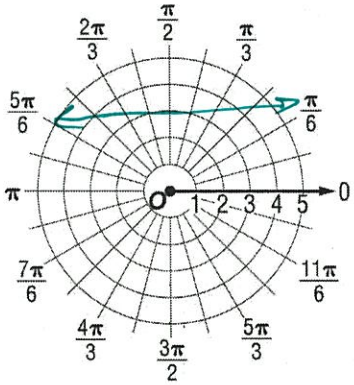
8. $y = 3$ line!

$r\sin\theta = 3$

$\frac{r\sin\theta}{\sin\theta} = \frac{3}{\sin\theta}$ $\quad r = \frac{3}{\sin\theta}$

$r = 3\csc\theta$





Write each equation in rectangular form and then identify its graph. Support your answer by graphing the polar form of the equation.

9. $r = 4$ circle!

$\left(\pm\sqrt{x^2 + y^2}\right)^2 = (4)^2$

$x^2 + y^2 = 16$

10. $r\cos\theta = 5$ line!

$x\left(\frac{x}{r}\right) = 5$

$x = 5$