

Converting Polar and Rectangular Equations: Practice

Write each rectangular equation in polar form.

1. $x^2 + y^2 = 36$

$$r^2 = 36$$

$$r = 6$$

2. $x^2 + y^2 = 3y$

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

$$r = 3 \sin \theta$$

3. $x = -2$

$$r \cdot \cos \theta = -2$$

$$r = \frac{-2}{\cos \theta}$$

4. $y = 6$

$$r \cdot \sin \theta = 6$$

$$r = \frac{6}{\sin \theta}$$

$$x^2 + (y+5)^2 = 25$$

5. $x^2 + \cancel{(y+5)^2} = 25$

$$x^2 + y^2 + 10y + 25 = 25$$

$$r^2 + 10r \sin \theta = 0$$

$$r^2 = -10r \sin \theta$$

$$r = -10 \cdot \sin \theta$$

6. $x^2 + y^2 = 6x$

$$r^2 = 6 \cdot r \cos \theta$$

$$r = 6 \cos \theta$$

Write each polar equation in rectangular form.

7. $r = 4$

(multiply by r) $r^2 = 4r$

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

$$\boxed{x^2 + y^2 = 16}$$

8. $r = 4 \cos \theta$

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

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

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

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

9. $r = 5 \sin(\theta)$

$$r^2 = 5r \sin \theta$$

$$x^2 + y^2 = 5y$$

$$x^2 + y^2 - 5y + \frac{25}{4} = \frac{25}{4}$$

$$\boxed{x^2 + \left(y - \frac{5}{2}\right)^2 = \frac{25}{4}}$$

10. $r = 5 \cos(\theta)$

$$r^2 = 5r \cos \theta$$

$$x^2 + y^2 = 5x$$

$$x^2 - 5x + \frac{25}{4} + y^2 = \frac{25}{4}$$

$$\boxed{\left(x - \frac{5}{2}\right)^2 + y^2 = \frac{25}{4}}$$

$\left(\frac{5}{2}\right)^2$
 $\frac{25}{4}$