

Polar Equations

Instructions: Convert each polar equation to a rectangular equation or vice versa. Arrange each equation in standard form for rectangular equations if possible, or as $r =$ for a polar equation.

1. $r = 8$

$$x^2 + y^2 = 64$$

2. $r \cos \theta = 6$

$$x = 6$$

3. $r = -5 \csc \theta$

$$y = -5$$

4. $r = 8 \sin \theta$

$$x^2 + (y - 4)^2 = 16$$

5. $r^2 = 10r \cos \theta$

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

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

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

or $3x^2 - y^2 = 0$

$$7. \quad x^2 + y^2 = 4y$$

$$r = 4\sin\theta$$

$$8. \quad y = 5$$

$$r = 5\csc\theta$$

$$9. \quad x^2 + y^2 = 49$$

$$r = \pm 7$$

$$10. \quad x^2 = 10y - y^2$$

$$r = 10\sin\theta$$

$$11. \quad y^2 = 10x$$

$$r = 10 \cdot \cos\theta \cdot \cos^2\theta$$

$$12. \quad y = \frac{\sqrt{3}}{3}x$$

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

Use the unit circle!

$$\theta = 30^\circ \text{ or } \theta = 210^\circ$$

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

or $-\frac{1}{2} \div -\frac{\sqrt{3}}{2}$

$$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$$

$30^\circ, 210^\circ$