

Name: _____

Convert the given points from polar coordinates to Cartesian/rectangular coordinates.

1. $(r, \theta) = (6, \pi)$

2. $(r, \theta) = \left(\frac{1}{2}, \frac{3\pi}{4}\right)$

3. $(r, \theta) = \left(-2, \frac{\pi}{6}\right)$

4. $(r, \theta) = \left(10, \frac{\pi}{3}\right)$

Convert the given points from Cartesian/rectangular coordinates to polar coordinates.

5. $(x, y) = (0, -3)$

6. $(x, y) = (5, 5)$

7. $(x, y) = \left(\sqrt{3}, -\frac{1}{3}\right)$

8. $(x, y) = (-1, \sqrt{3})$

9. (Challenge) Use what you know about Taylor series to approximate the angle θ for the point $(x, y) = (2, 1)$ without using a calculator.

Write each polar equation in Cartesian form (in terms of x and y). What familiar shape is the graph?

10. $r = \sec(\theta)$

11. $r = \cos(\theta) - \sin(\theta)$

12. $\sin(\theta) - r \cos^2(\theta) = \frac{1}{r}$

Write each Cartesian equation in polar form (in terms of r and θ).

13. $x^2 - y^2 = 1$

14. $y = x$

15. $\sqrt{x^2 + y^2} - 1 = \frac{x}{\sqrt{x^2 + y^2}}$

16. What familiar graph is given by the polar equation $\ln(r) = r \cos(\theta) - \ln(\sin(\theta))$?