

Lesson 9.2: Polar Graphs

Plotting Polar Points

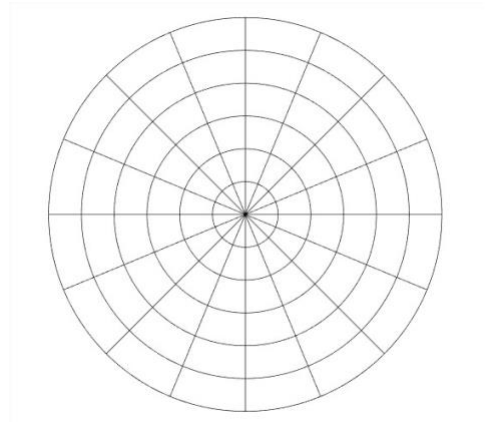
Plot the following polar points on the polar grid at right.

a. $\left(3, \frac{\pi}{6}\right)$

c. $(4, \pi)$

b. $\left(3, -\frac{5\pi}{6}\right)$

d. $\left(-2, \frac{3\pi}{2}\right)$



Point Conversions

Examples:

1. Write the rectangular point $(-1, \sqrt{3})$ in polar form such that:

a. $r > 0, \theta > 0$

b. $r > 0, \theta < 0$

c. $r < 0, \theta > 0$

d. $r < 0, \theta < 0$

2. Change the point $(2, \pi)$ to rectangular.

3. Change the point $(-3, 3)$ to polar.

Equation Conversions

Examples: Convert from rectangular to polar.

1. $y = 4$

2. $3x - y + 2 = 0$

3. $x^2 + y^2 - 2x = 0$

Examples: Convert from polar to rectangular.

1. $r = -2$

2. $r = 3\cos(\theta)$

3. $r = 3\csc(\theta)$

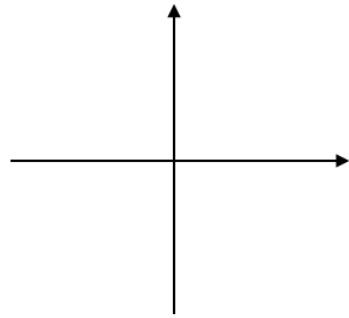
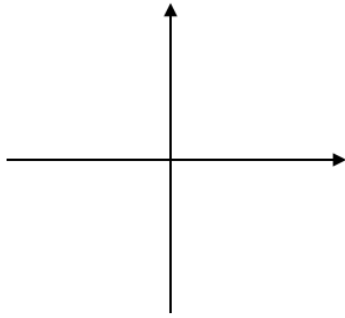
Sketching Polar Graphs

Examples: Use a calculator on those in **bold**.

1. Circles

a. $r = 2\cos(\theta)$

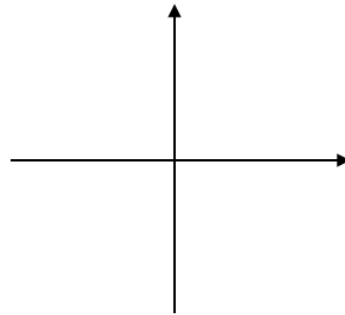
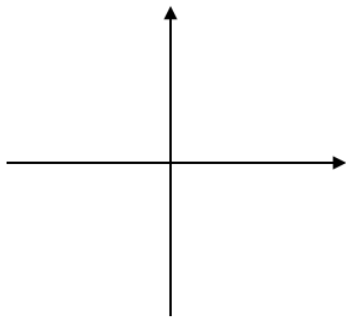
b. $r = 5\sin(\theta)$



2. Rose Petal Curves

a. $r = 3\cos(2\theta)$

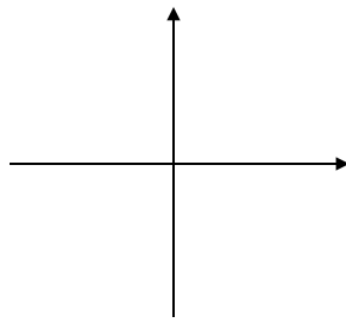
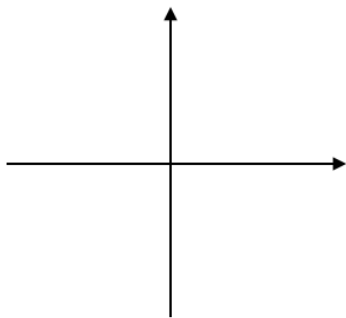
b. $r = 4\sin(3\theta)$



3. Limaçons

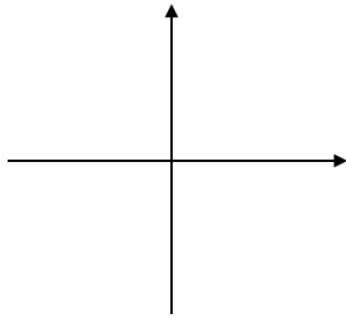
a. $r = 2 - 3\cos(\theta)$

b. $r = 3 + 3\sin(\theta)$



4. Lemniscate

a. $r^2 = 9\sin(2\theta)$

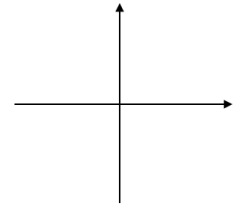


Sketching Polar Graphs

Tangent Lines

1. Find an equation of the tangent line to the graph of $r = 2(1 - \sin(\theta))$ at the point $(2,0)$.

2. Find the points at which the graph of $r = 2 - 2\cos(\theta)$ has horizontal tangents.



3. Find the equations of the lines tangent to $r = 4\sin(3\theta)$ at the pole.

