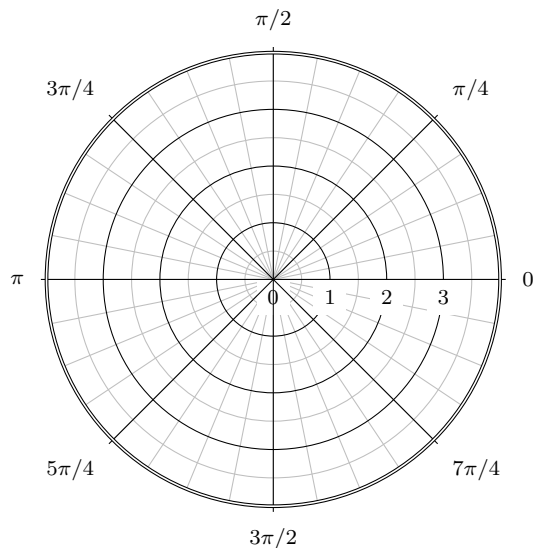


1. Plot the following points on the grid at right:

- (a)  $(r, \theta) = (2, 2\pi/3)$   
 (b)  $(r, \theta) = (4, 3\pi/2)$   
 (c)  $(r, \theta) = (-3, 3\pi/4)$   
 (d)  $(r, \theta) = (0, 11\pi/6)$



2. We need a way to translate between polar coordinates and rectangular coordinates. Suppose the polar coordinate  $(r, \theta)$  and the rectangular coordinate  $(x, y)$  correspond to the same location in the plane.

- (a) Using trigonometry, we have the formula

$$\frac{x}{r} = \cos(\theta).$$

Write down a similar formula corresponding to  $y$ .

- (b) Solve the formulas above for  $x$  and  $y$ , respectively. Now you have a way to convert polar coordinates to rectangular coordinates!
- (c) On the other hand, can you find two formulas that will help you solve for  $r$  and  $\theta$ ?
- (d) Solve your formulas for  $r$  and  $\theta$  and you'll have a way to convert rectangular coordinates to polar coordinates! (It's okay if your formula for  $\theta$  depends on which quadrant the point is in.)
3. Convert  $(r, \theta) = (2, 2\pi/3)$  into rectangular coordinates.
4. Convert  $(x, y) = (-5, -5\sqrt{3})$  into polar coordinates.
5. Convert  $r = 2$  into rectangular coordinates. What shape is this curve?
6. Convert  $r = 3 \cos(\theta)$  into rectangular coordinates.