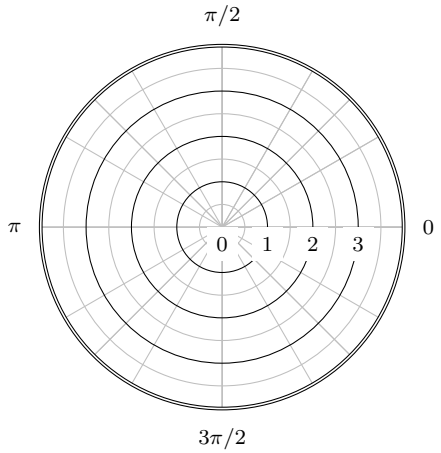
1. Plot each of the following points on the graph below:



   (a) $(r, \theta) = (3, \frac{7\pi}{6})$

   (b) $(r, \theta) = (2, -\frac{3\pi}{4})$

   (c) $(r, \theta) = (-1, \frac{5\pi}{4})$

   (d) $(r, \theta) = (4, \pi)$

2. Convert $(2, -2)$ to polar coordinates. Give two possible answers.

3. Give rectangular coordinates for these points:

   (a) $(r, \theta) = (3, \frac{5\pi}{4})$

   (b) $(r, \theta) = (-4, \frac{11\pi}{6})$

4. Convert the following to rectangular coordinates:

   (a) $r = 8$

   (b) $r = 2 \sec \theta$

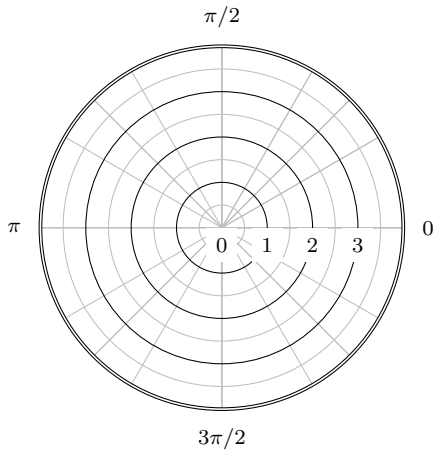
5. Convert the following to polar coordinates:

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

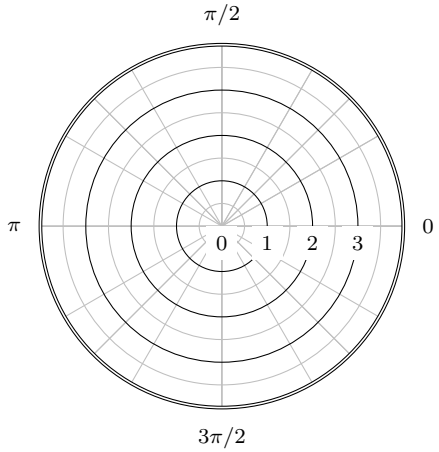
   (b) $y = 2x$

6. Graph the following polar equations. Note any values of θ where the graph hits the origin.

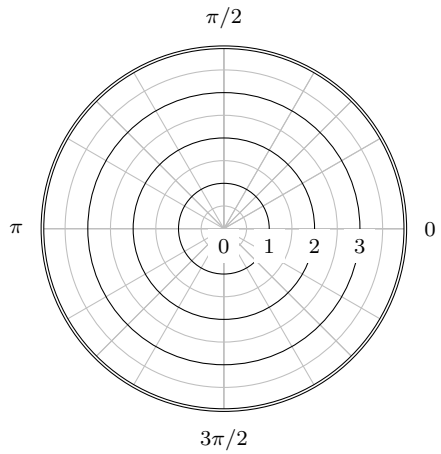
   (a) $r = 2 + 2\cos\theta$



   (b) $r = 1 + 2\cos\theta$



(c) $r = 3\sin 2\theta$



7. Shade the region that lies inside both of the curves $r = 1 + \sin\theta$ and $r = 3\sin\theta$. Find the intersection points.