11.3 Polar Coordinates

In-class work:

1. Plot the following points: $\left(1,\frac{5p}{4}\right),(2,3p),\left(2,-\frac{2p}{3}\right),\left(-3,\frac{3p}{4}\right)$.
2. Convert $\left(2,\frac{p}{3}\right)$ from polar coordinates to Cartesian coordinates.
3. Represent $(1,-1)$ in terms of polar coordinates.
4. What curve is represented by the polar equation $r=2$?
5. Sketch the polar curve $q=1$.
6. a) Sketch the curve with polar equation $r=2\cos q$.
   b) Find a Cartesian equation for this curve.
7. (Exercise #6/11.4) Find the Cartesian coordinates of the following points given in polar coordinates.
   b) $(1,0)$ c) $\left(0,\frac{p}{2}\right)$ e) $\left(-3,\frac{5p}{6}\right)$
8. (Exercise #7/11.4) Find the polar coordinates with $0\le q<2p$, $r\ge 0$ of the following points given in Cartesian coordinates:
   a) $(1,1)$ b) $(-3,0)$
9. (Exercise #9/11.4) Find r,q with $0\le q<2p$, $r\le 0$ of the following points given in Cartesian coordinates:
   a) $(3,3)$
10. (Exercises #28, 32, 37, 38, 42, 51/11.4) Replace the polar equations with equivalent Cartesian equations. Then describe or identify the graph.
    a) $r\sin q=-1$ b) $r=-3\sec q$ c) $r=\dfrac{5}{\sin q-2\cos q}$ d) $r^2\sin 2q=2$
    e) $r\sin q=\ln r+\ln\cos q$ f) $r\sin\left(q+\frac{p}{6}\right)=2$
11. (Exercises # 54,55, 58, 61, 66/11.4) Replace the Cartesian equations with equivalent polar equations.
    a) $y=1$ b) $x=y$ c) $x^2-y^2=1$ d) $y^2=4x$
    e) $(x+2)^2+(y-5)^2=16$