AP Calculus BC
Lesson 11.3 Polar Coordinates

1. Convert each polar ordered pair into rectangular coordinates:

   (a) $(3,30°)$ (b) $(–5,180°)$ (c) $(2,\frac{\pi}{3})$

   (d) $(1,\frac{5\pi}{6})$ (e) $(–1,\pi)$

2. Convert each rectangular ordered pair into polar coordinates:

   (a) $(1,1)$ (b) $(–1,\sqrt{3})$ (c) $(-\sqrt{2},\sqrt{2})$

3. Convert each polar equation into a parametric equation:

   (a) $r = 3\cos(\theta)$ (b) $r = 6\sin(2\theta)$ (c) $r = 2^{\theta}$

4. Show that the polar coordinates (r,θ) and $(–r,\theta + \pi)$ give the same point in Cartesian coordinates.

5. *(Are you in a good mode?)*
   (a) Find the point(s) of intersection of the curves
   $r = \cos(2\theta)$ and $r = 1 + 3\cos(\theta)$.

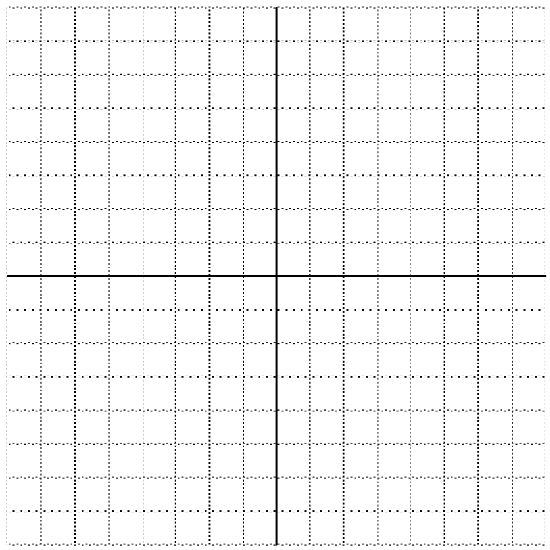
   (b) Solve the system:
   $r = \cos(2\theta)$
   $r = 1 + 3\cos(\theta)$

   Is your answer any different from the answer in part (a)? Explain.

6. For each of the following polar equations, graph the equation BY HAND and name the curve:

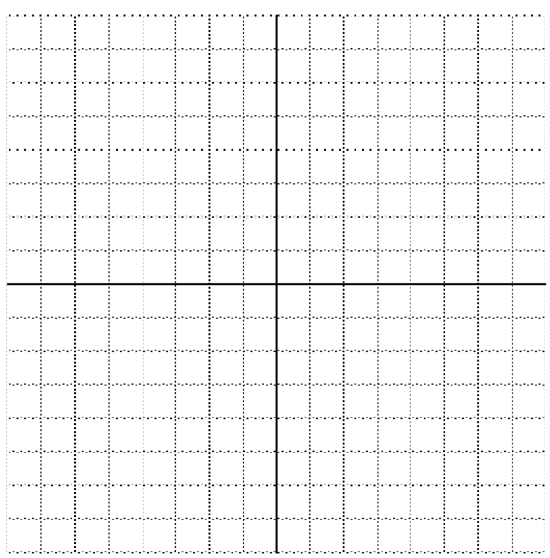
(a) $r = 4\sin(\theta)$

θ	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$
r															



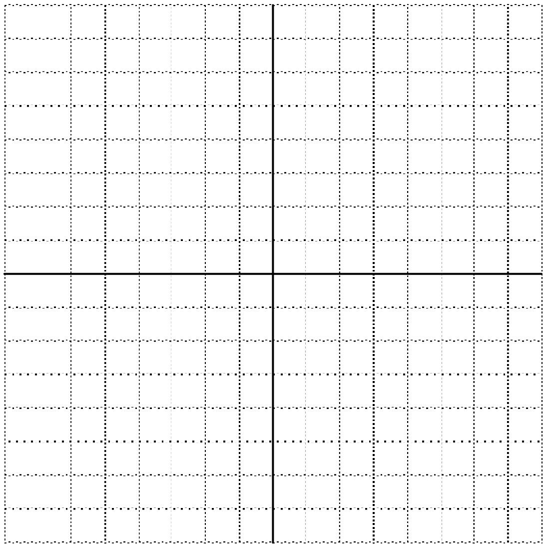
(b) $r = 4 + 6\cos(\theta)$

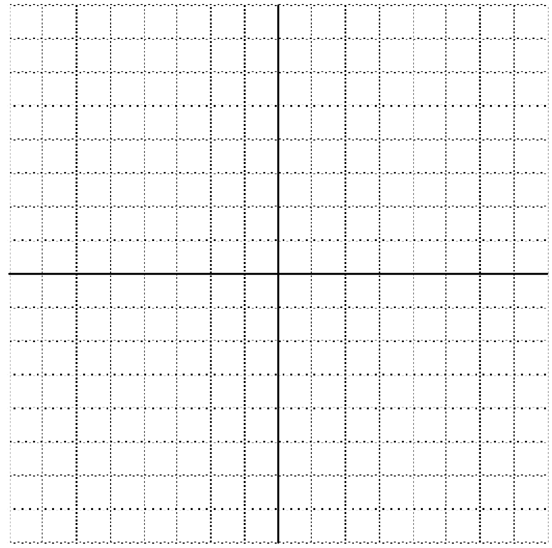
θ	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$
r															



(c) $r = 6\sin(3\theta)$

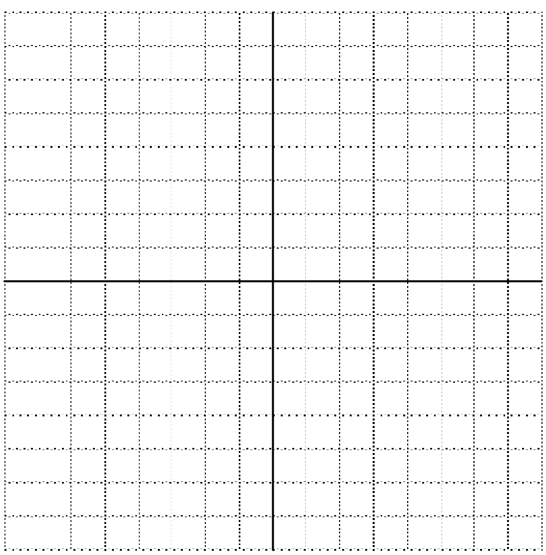
(d) $r^2 = 4\cos(\theta)$

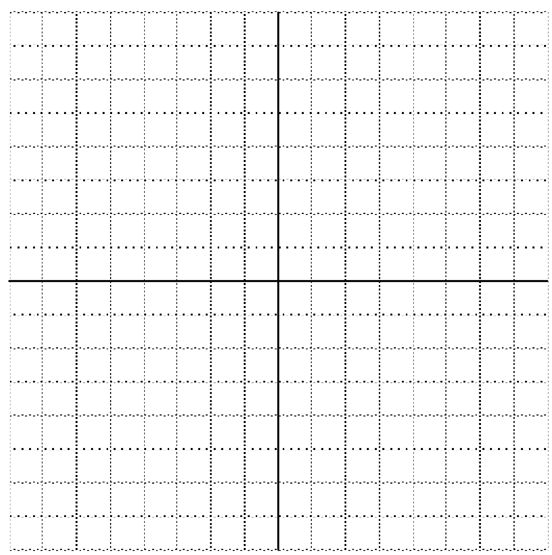




(e) $r = 2^{\theta/\pi}$

(f) $r = \dfrac{6}{1-2\cos(\theta)}$





(g) $r \cdot \sin(\theta) = 5$

(h) $r = 4 - 4\cos(\theta)$