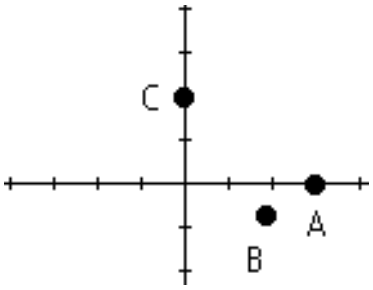
H.1 # 2, 3, 6, 13, 16, 31, 36, 40

2. a) $[3,0] = [3,2\pi] = [-3,\pi]$ (Point A)
$[3,2n\pi]$ *or* $[-3,(2n-1)\pi]$ for any integer *n* will do.

b) $\left[2,-\frac{\pi}{7}\right] = \left[2,\frac{13\pi}{7}\right] = \left[-2,\frac{6\pi}{7}\right]$ (Point B)

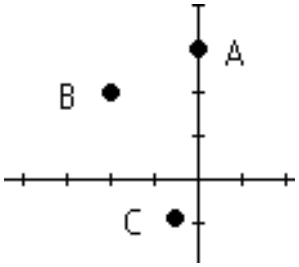
c) $\left[-1,-\frac{\pi}{2}\right] = \left[1,\frac{\pi}{2}\right] = \left[-1,\frac{3\pi}{2}\right]$ (Point C)



3. a) $\left[3,\frac{\pi}{2}\right] = (0,3)$ (Point A)

b) $\left[2\sqrt{2},\frac{3\pi}{4}\right] = (-2,2)$ (Point B)

c) $\left[-1,\frac{\pi}{3}\right] = \left[\frac{1}{2},-\frac{\sqrt{3}}{2}\right]$ (Point C)



6. a) $\left(-1,-\sqrt{3}\right) = \left[2,\frac{4\pi}{3}\right] = \left[-2,\frac{\pi}{3}\right]$

b) $(-2,3) = \left[\sqrt{13},\pi - \tan^{-1}\left(\frac{3}{2}\right)\right] = \left[\sqrt{13},2\pi - \tan^{-1}\left(\frac{3}{2}\right)\right]$

In decimals, $(-2,3) = [3.6056,2.1588] = [-3.6056,5.3004]$

13. $r = 3\sin\theta \qquad r^2 = 3r\sin\theta \qquad x^2 + y^2 = 3y \qquad x^2 + \left(y - \frac{3}{2}\right)^2 = \left(\frac{3}{2}\right)^2$

16. $r = \dfrac{1}{1+2\sin\theta} \qquad r + 2r\sin\theta = 1 \qquad r^2 = (1-2r\sin\theta)^2$

$x^2 + y^2 = (1-2y)^2 = 1 - 4y + 4y^2$

$x^2 - 3y^2 + 4y = 1$

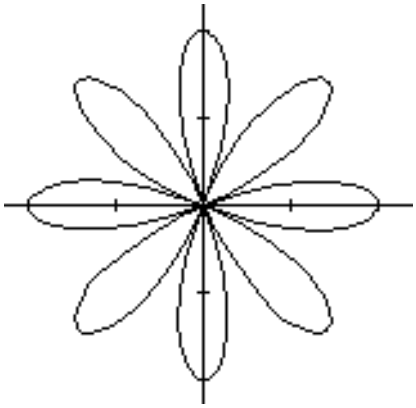
$x^2 - 3\left(y^2 - \frac{4}{3}y + \left(\frac{2}{3}\right)^2 - \left(\frac{2}{3}\right)^2\right) = 1$

$x^2 - 3\left(y - \frac{2}{3}\right)^2 + \frac{4}{3} = 1$

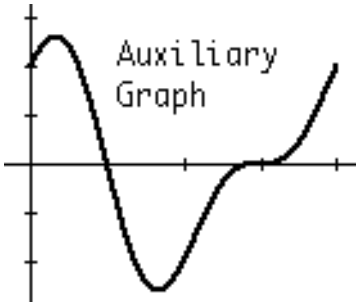
$x^2 - 3\left(y - \frac{2}{3}\right)^2 = -\frac{1}{3}$

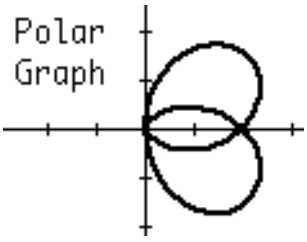
$-3x^2 + 9\left(y - \frac{2}{3}\right)^2 = 1$

31. $r = 2\cos 4\theta$



36.





40. (a) $r = \sin\left(\frac{\theta}{2}\right)$ is graph VI since $r = 0$ at 0 and not again till $\theta = 4\pi$

(b) $r = \sin\left(\frac{\theta}{4}\right)$ is graph III since $r = 0$ at 0 and not again till $\theta = 8\pi$

(c) $r = \sec(3\theta)$ is graph IV because it has discontinuities and $r \geq 1$.

(d) $r = \theta\sin\theta$ is graph V because $r(0) = 0$ and r keeps increasing with each loop.

(e) $r = 1 + 4\cos 5\theta$ is graph II because it has 5 big loops and 5 small ones.

(f) $r = \frac{1}{\sqrt{\theta}}$ is graph I because r decreases with θ, making a spiral in toward the pole.