

Math 3B: 10.6 HW #2, 4

(1)

② a) $r = \frac{4}{2+3\cos\theta} \cdot \frac{1}{\frac{1}{2}}$

$r = \frac{2}{1+\frac{3}{2}\cos\theta}$

$e = \frac{3}{2} \Rightarrow$ hyperbola

$\frac{3}{2} \cdot d = 2 \Rightarrow d = \frac{4}{3}$ (directrix (rt. of pole))

Polar graph:

$\theta = 0 : r = \frac{4}{5}$

$\theta = \frac{\pi}{2} : r = 2$

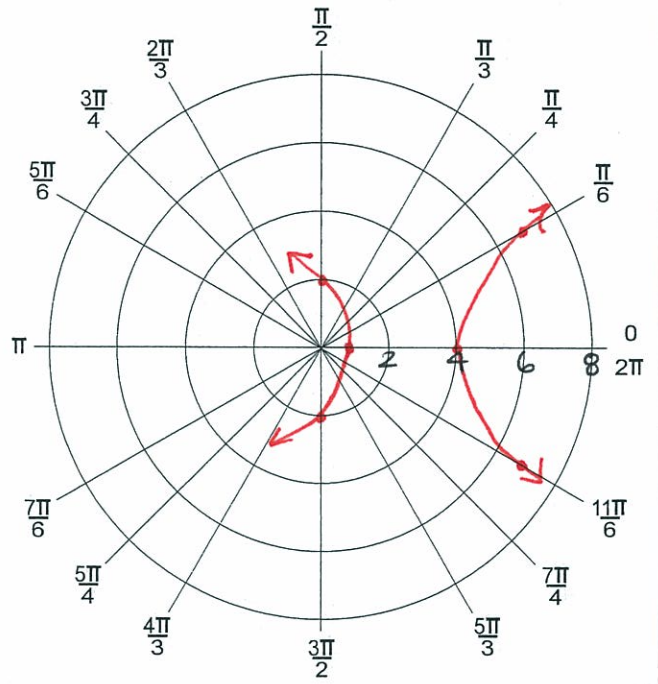
$\theta = \pi : r = -4$

$\theta = \frac{3\pi}{2} : r = 2$

More points:

$\theta = \frac{5\pi}{6} : r \approx -6.7$

$\theta = \frac{7\pi}{6} : r \approx -6.7$



b) $r = \frac{5}{3+3\sin\theta} \cdot \frac{1}{\frac{1}{3}}$

$r = \frac{\frac{5}{3}}{1+\sin\theta}$

$e = 1 \Rightarrow$ parabola

$d = \frac{5}{3}$ (above pole)

Polar graph:

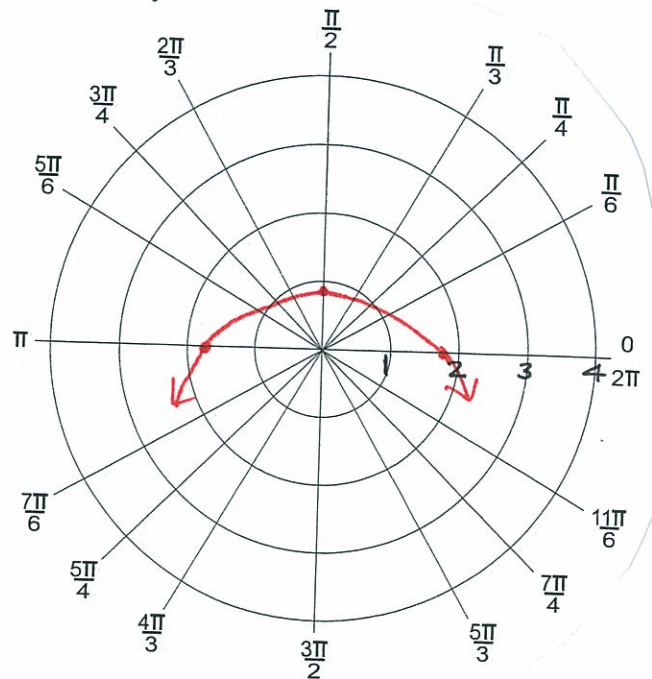
$\theta = 0 : r = \frac{5}{3}$

$\theta = \frac{\pi}{2} : r = \frac{5}{6}$

$\theta = \pi : r = \frac{5}{3}$

$\theta = \frac{3\pi}{2} : \text{undefined}$

$\theta = 2\pi : r = \frac{5}{3}$



4 a) $r = \frac{4}{2 - 3\sin\theta} \cdot \frac{\frac{1}{2}}{\frac{1}{2}}$

$r = \frac{2}{1 - \frac{3}{2}\sin\theta}$

$e = \frac{3}{2} > 1 \Rightarrow$ hyperbola

$\frac{3}{2} \cdot d = 2$

$d = \frac{4}{3}$

directrix: $\frac{4}{3}$ units below pole

b) $r = \frac{12}{4 + \cos\theta} \cdot \frac{\frac{1}{4}}{\frac{1}{4}}$

$r = \frac{3}{1 + \frac{1}{4}\cos\theta}$

$e = \frac{1}{4} < 1 \Rightarrow$ ellipse

$\frac{1}{4} \cdot d = 3$

$d = 12$

directrix: 12 units to the right of pole