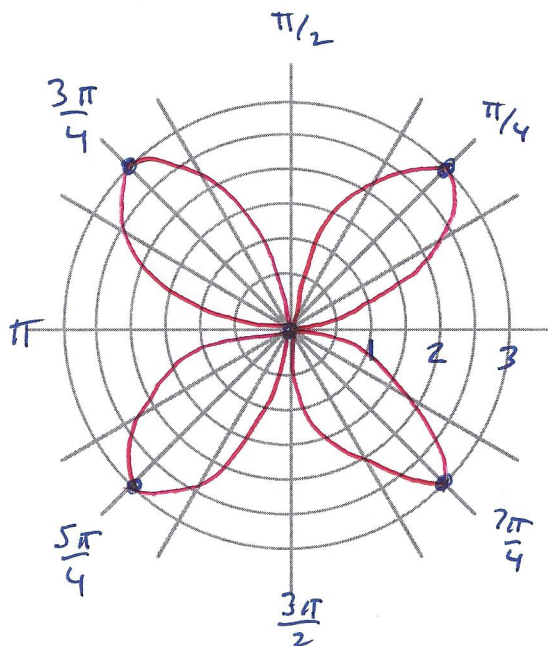
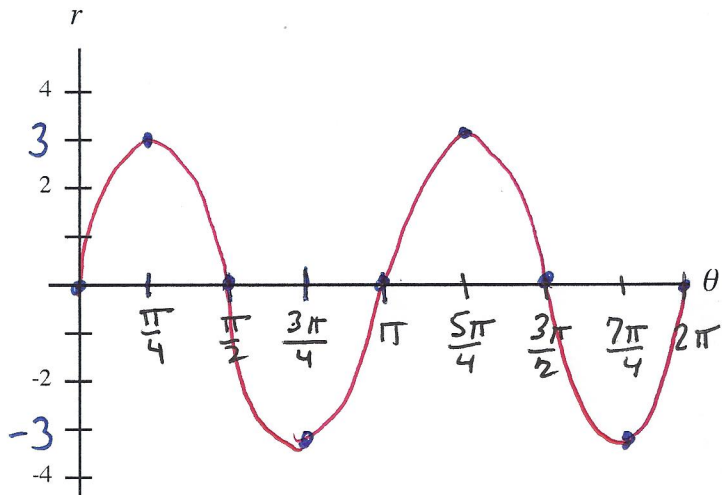
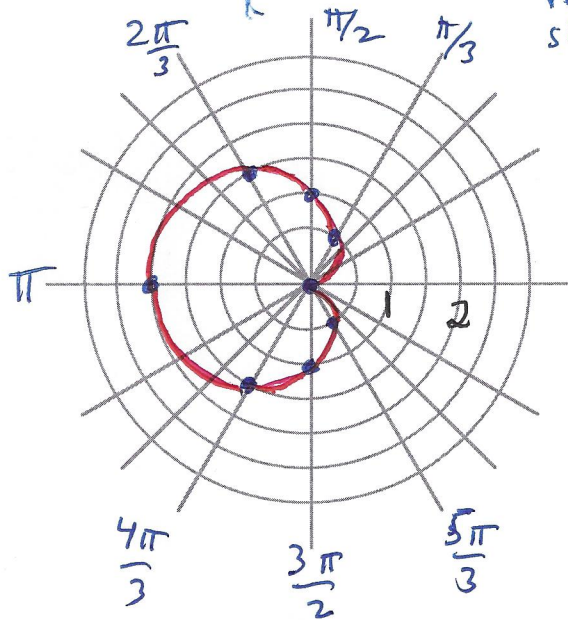
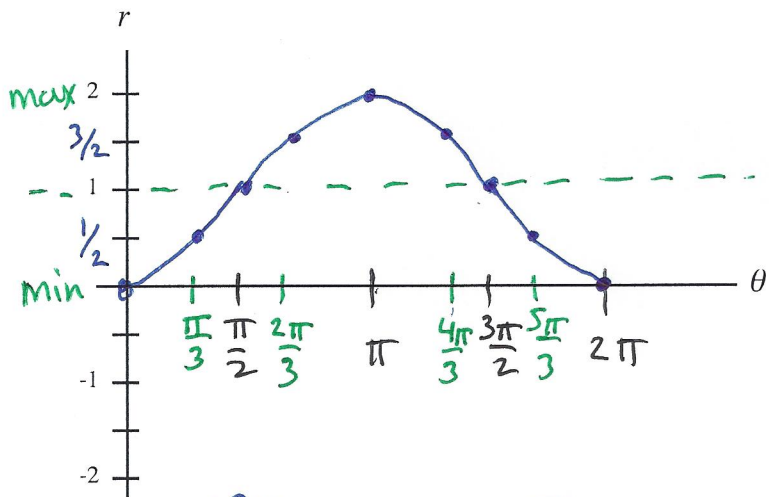


11. $r = 3\sin(2\theta)$ $\begin{cases} \text{ampl.} = 3 \\ \text{per} = \frac{2\pi}{2} = \pi \end{cases}$



Section 10.4, Area

12. Sketch the curve and find the area that it encloses: $r = 1 - \cos\theta$ $\begin{cases} r = -\cos\theta + 1 \\ \text{ampl} = 1 \\ \text{per} = 2\pi \\ \text{reflected} \\ \text{shift up} \end{cases}$



$$A = \frac{1}{2} \int_0^{2\pi} r^2 d\theta = \frac{1}{2} \cdot 2 \int_0^{\pi} (1 - \cos\theta)^2 d\theta$$

$$= \int_0^{\pi} (1 - 2\cos\theta + \cos^2\theta) d\theta$$

$$= \int_0^{\pi} \left(1 - 2\cos\theta + \frac{1}{2} + \frac{1}{2}\cos(2\theta)\right) d\theta$$

$$= \theta - 2\sin\theta + \frac{1}{2}\theta + \frac{1}{2} \cdot \frac{1}{2}\sin(2\theta) \Big|_0^{\pi}$$

$$= \left[\pi - 2 \cdot 0 + \frac{1}{2}\pi + \frac{1}{4} \cdot 0 \right] - [0]$$

$$= \pi + \frac{1}{2}\pi$$

$$= \boxed{\frac{3\pi}{2}}$$