Section 10.3

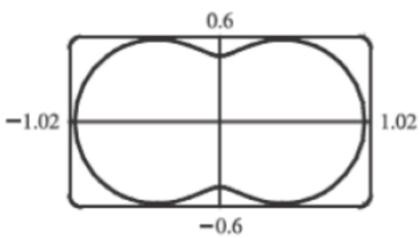
Polar Coordinates

66. $r = e^\theta \Rightarrow x = r\cos\theta = e^\theta\cos\theta,\ y = r\sin\theta = e^\theta\sin\theta$.
    And then compute $\frac{dy}{d\theta} = 0$ and $\frac{dx}{d\theta} = 0$.

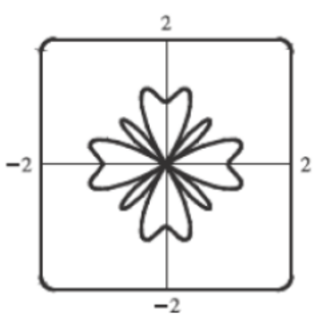
68. By differentiating implicitly, $r^2 = \sin 2\theta \Rightarrow 2r(\frac{dr}{d\theta}) = 2\cos 2\theta \Rightarrow \frac{dr}{d\theta} = \frac{1}{r}\cos 2\theta$.
    And then compute $\frac{dy}{d\theta} = 0$ and $\frac{dx}{d\theta} = 0$.

70. These curves are circles which intersect at $(0,0)$ and at $(\frac{a}{\sqrt{2}}, \frac{\pi}{4})$.

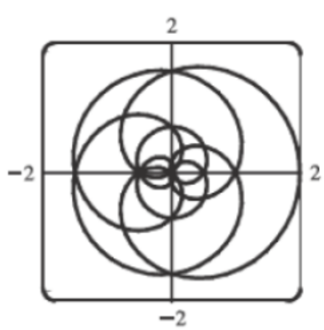
72.



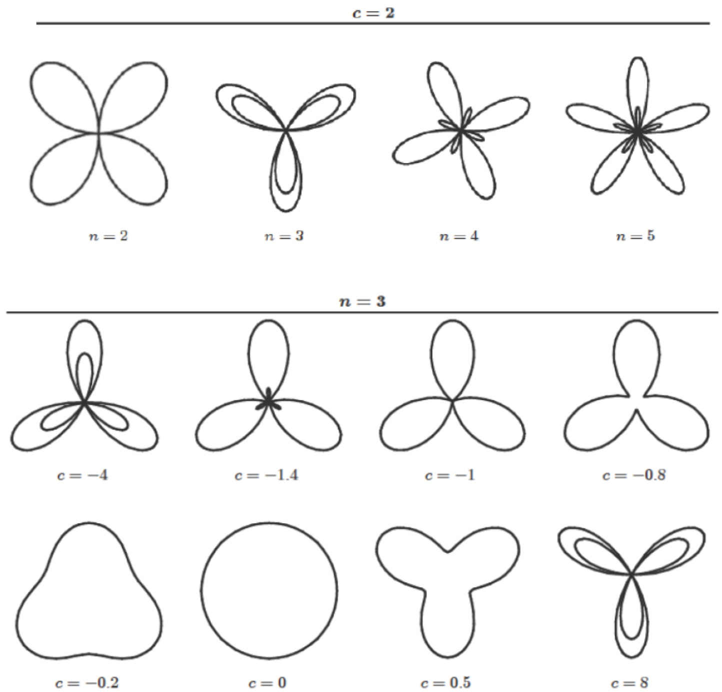
74.



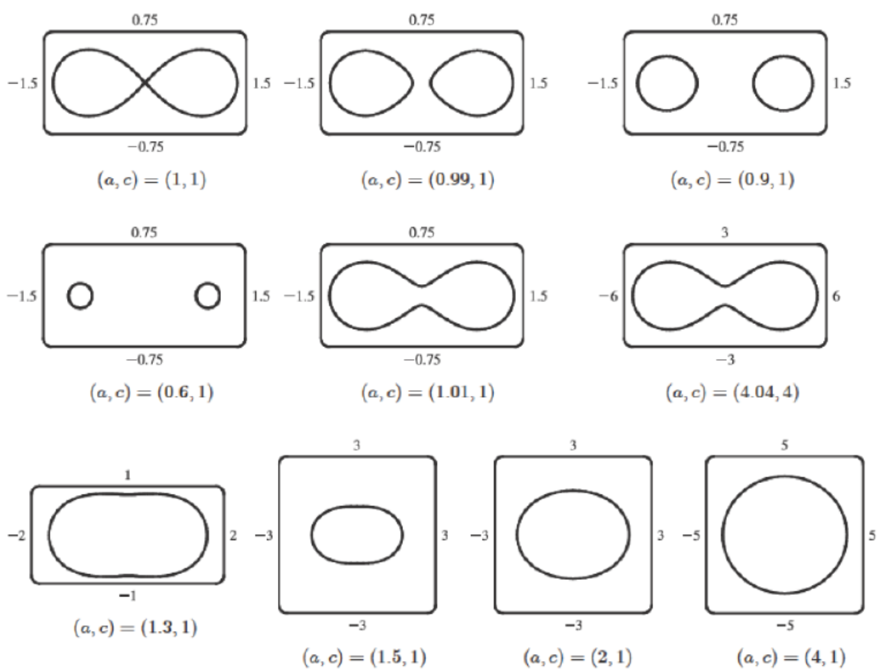
76.



80.



82.



84. (a) Direct compute. (c) Consider $a = \frac{r}{dr/d\theta} \Rightarrow \frac{dr}{d\theta} = \frac{1}{a}r$.