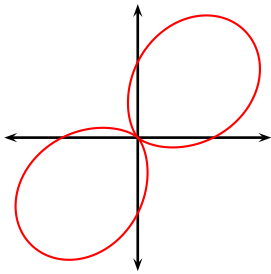


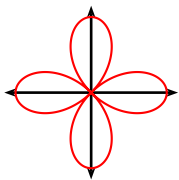
Calculus II

Homework on Lecture 13

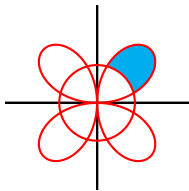
1. Give a geometric definition of the cycloid curve using a circle of radius 1. Using that definition, derive equations for the cycloid curve. Find area locked between one “arch” of the cycloid curve and the x axis.
2. (a) The curve given in polar coordinates by $r = 1 + \sin 2\theta$ is plotted below by computer. Find the area lying outside of this curve and inside of the circle $x^2 + y^2 = 1$.



- (b) The curve given in polar coordinates by $r = \cos(2\theta)$ is plotted below by computer. Find the area lying inside the curve and outside of the circle $x^2 + y^2 = \frac{1}{4}$.



- (c) Below is a computer generated plot of the curve $r = \sin(2\theta)$. Find the area locked inside one petal of the curve and outside of the circle $x^2 + y^2 = \frac{1}{4}$.



3. The answer key has not been proofread, use with caution.
 - (a) Sketch the graph of the curve given in polar coordinates by $r = 3 \sin(2\theta)$ and find the area of one petal.
 - (b) Sketch the graph of the curve given in polar coordinates by $r = 4 + 3 \sin \theta$ and find the area enclosed by the curve.