

Math 231/199: Calculus 2 Merit

Worksheet 21

November 29, 2007

- (1) Sketch the polar curve $r = \sin(3\theta)$. Find its slope at $\theta = 0$ and $\theta = \pi/3$.

(2) Sketch the polar curve $r = 3 + 6 \cos(\theta)$. Find its slope at $\theta = 5\pi/6$.

(3) Find the area inside the polar curve $r = 2 + 2 \cos(\theta)$.

(4) Find the area inside one leaf of the daffodil $r = \sin(4\theta)$.

- (5) Find the area inside $r = 2$ and outside $r = 2 - 2\cos(\theta)$.

(6) Find all intersections of the graphs $r = 1 - 2 \cos(\theta)$ and $r = 2 \sin(\theta)$.

(7) Find the arc length of the curve $r = \sin(3\theta)$.

(8) Find the area of the region bounded by the curves $y = 1/x$, $y = mx$, and $y = 2mx$ in the two cases $m = 1$ and $m = 2$.

(9) An *equichordal point* of a region is a point in that region such that every chord (line segment between two boundary points) through that point has the same length. For example, the center of a circle is an equichordal point. Show that the limaçon $r = 5 + 4 \cos(\theta)$ has an equichordal point at the pole.