MA114 Summer 2018
Worksheet 25 – Calculus with Polar Curves – 7/26/18

1. Find the slope dy/dx for the following polar curves:

   a) $r = 2\cos(\theta) + 1$

   b) $r = \dfrac{1}{\theta}$

2. Compute the slope of the tangent line to the graph of $r = \sin\theta$ at $\theta = \pi/3$, and sketch the curve and the tangent line.

3. Find the area enclosed by one leaf of the curve $r = \sin 2\theta$.

4. Find the arc length of one leaf of the curve $r = \sin 2\theta$.

5. Find the area between the inner and outer loop of the limaçon $r = 2\cos\theta - 1$.

6. Find the tangent line to the polar curve $r = \theta^2$ at $\theta = \pi$.

7. Find the length of the curve $r = \theta^2$ for $0 \leq \theta \leq 2\pi$.

8. Find the area of the region that lies inside both the curves $r = \sqrt{3}\sin\theta$ and $r = \cos\theta$.

9. Find the point(s) where the tangent line to the curve $r = 2 + \sin\theta$ is horizontal.