POLAR COORDINATES

BLAKE FARMAN

Lafayette College

Name: _____

1. Plot each of the following points in the plane, then convert them to Cartesian coordinates.

(a) $(2, 5\pi/6)$,

(b) $(1, -2\pi/3)$,

(c) $(-1, 5\pi/4)$

2. Sketch $r = 2\cos(4\theta)$.

Find the slope of the tangent line to the given polar curve at the point specified by the value of θ.

3. $r = 2\cos(\theta)$, $\theta = \pi/3$

4. $r = \cos(\theta/3)$, $\theta = \pi$.

5. Use the formula

$$A = \int_a^b \frac{1}{2} r^2 \, d\theta$$

to compute the area of one leaf of the four-leaved rose $r = \cos(2\theta)$.

6. Use the formula

$$L = \int_a^b \sqrt{r^2 + \left(\frac{dr}{d\theta}\right)^2} \, d\theta$$

to set up an integral that computes the length of the cardioid $r = 1 + \sin(\theta)$.