Worksheet, aka Group Exam 5 Name: _____

Math 142

1. **Parametric Equations.** Give a careful sketch of the parametric curves given below in the space provided. Label the point on each curve where $t = 0$ and put arrows on the curve indicating the direction of travel along the curve as t increases.

$$\begin{cases} x &= -\cos(t) \\ y &= \sin(t) \end{cases}$$

$$\begin{cases} x &= 3\cos(t) \\ y &= \sin(t) \end{cases}$$

$$\begin{cases} x &= -t \\ y &= 1+t \end{cases}$$

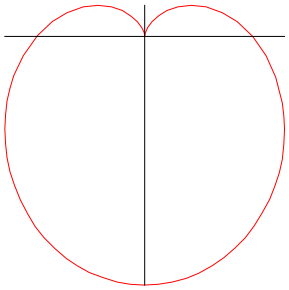
$$\begin{cases} x &= e^t \\ y &= 1-e^t \end{cases}$$

2. Find the area inside the ellipse whose graph is given by the parametric equation

$$\begin{cases} x = & \cos(5t) \\ y = & -4\sin(5t) \end{cases}$$

3. **Polar Coordinates and Polar Equations**

A:



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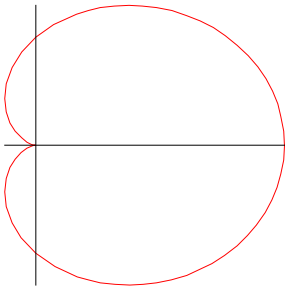

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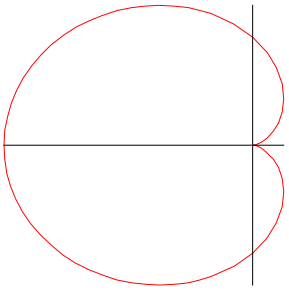

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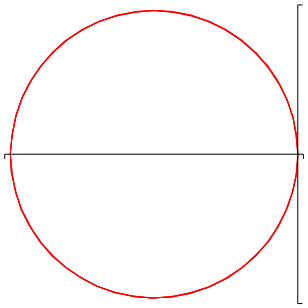

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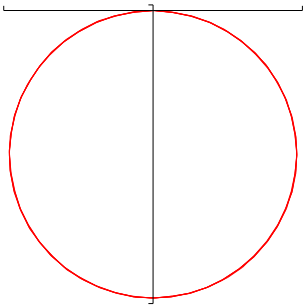

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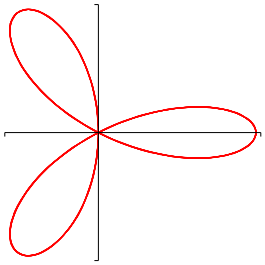
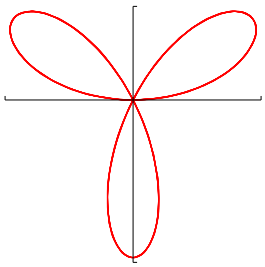
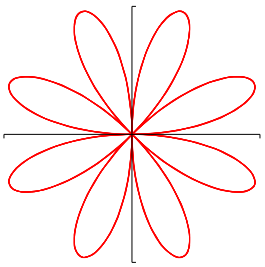


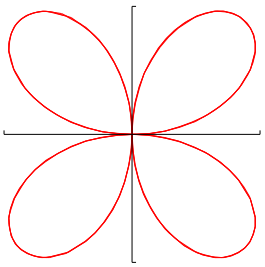
G:



H:



I:



Write the letter of the graph that best fits the graph of the given *polar curve* in the blank space provided. If not specified, the domain is all real θ-values.

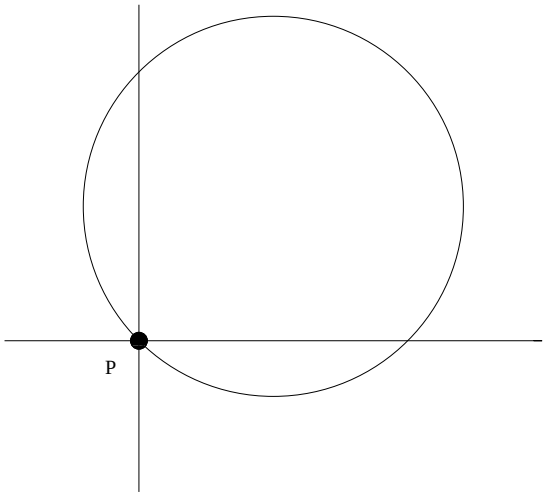
(i) $r = -\cos(\theta)$ _____

(ii) $r = \sin(4\theta)$ _____

(iii) $r = 1 - \cos(\theta)$ _____

(iv) $r = \cos(3\theta)$ _____

4. The graph of the polar curve $r = \sin(\theta) + \cos(\theta)$ is given below.



a) Find two different descriptions of the point **P** in polar coordinates that satisfy the polar curve $r = \sin(\theta) + \cos(\theta)$.

b) Calculate the area inside the polar curve $r = \sin(\theta) + \cos(\theta)$. [Note: part a) should help you figure out the limits of integration.]