

NAME _____

MATH 242, Fall 2007

T.A. _____

Exam 2: October 31

Arrange your work as clearly and neatly as possible, and cross out incorrect work. **Unless otherwise noted, you must justify all answers to receive full credit.** You may not use calculators, notes, or any other kinds of aids.

1. (10 points) Identify and sketch the curve $x^2 + 4x - 5 + 9y^2 = 0$, labeling all vertices.

$$\begin{aligned} \frac{d}{dx} (\sin^{-1} x) &= \frac{1}{\sqrt{1-x^2}}, & 1 - \sin^2 \theta &= \cos^2 \theta, & \sin^2 \theta &= \frac{1}{2}(1 - \cos 2\theta) \\ \frac{d}{dx} (\tan^{-1} x) &= \frac{1}{1+x^2}, & 1 + \tan^2 \theta &= \sec^2 \theta, & \cos^2 \theta &= \frac{1}{2}(1 + \cos 2\theta) \end{aligned}$$

2. (12 points each) Evaluate each integral.

(a) $\int \ln(x+1) \, dx$

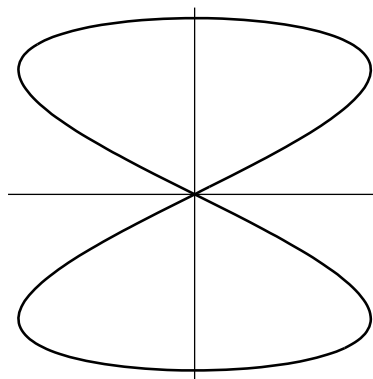
(b) $\int x^3 \sqrt{4-x^2} \, dx$

3. (12 points each) Evaluate each integral, or show divergence.

(a) $\int_1^4 \frac{1}{x^3 - x} dx$

(b) $\int_1^\infty xe^{-x} dx$

4. (15 points) Find equations for both lines tangent to the curve $x = \sin(2t)$, $y = \sin(t)$ at the origin.



5. (15 points) Carefully plot the polar curve $r = 1 - \sin \theta$, labeling at least four points.

6. (12 points) Find the area of the shaded region.

