

EXAM 1

MAT 222

Name _____

February 8, 2010

- ❖ You have 50 minutes to complete the exam.
- ❖ Partial credit will be given so you must **SHOW ALL OF YOUR WORK**. Put all of your work and answers in the space provided. Scratch paper is not allowed.
- ❖ Place your books, notebooks, etc. on the floor. The only items on your desk should be this exam and pencil/eraser/pen. Calculators are not allowed.

Problem	Points	Points per part	Points Earned
True-False	10	2	
1	18	6	
2	6		
3	30	10	
4	12		
5	12		
6	12		
TOTAL	100		

Please circle your section:

8:00
Friske

11:30
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I. True – False

- T F a. $y' + 3xy = 5x^2y^3$ is a Bernoulli differential equation.
T F b. $y' = 6y$ is a separable differential equation.
T F c. You can use \arcsin to integrate $\int \frac{1}{9-x^2} dx$.
T F d. $y' + x^2y = xe^x$ is a first order linear differential equation.
T F e. The solution of an initial value problem has an arbitrary constant C .

II. Basics

1. For each integral, identify which of the following integration methods is the best *to start with*. DO NOT DO THE INTEGRATION!

complete the square	u-substitution	break into two integrals	use arc function
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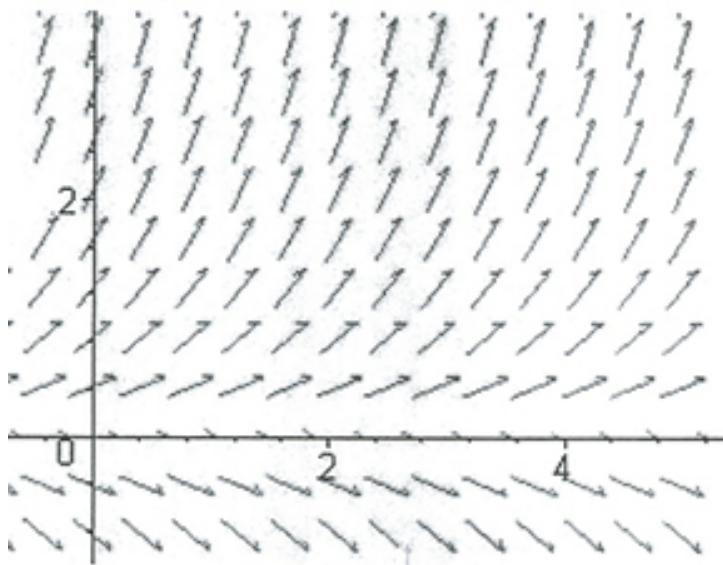
(a) $\int \frac{1}{2x-1} dx$

(b) $\int \frac{x-4}{\sqrt{9-x^2}} dx$

(c) $\int \frac{1}{x^2+2x+5} dx$

III. Applications

2. On the slope field below draw a solution curve $y(x)$ passing through the point $(2, 2)$. Determine the value of $\lim_{x \rightarrow \infty} y(x) =$ _____



3. Find the antiderivative. DO NOT SIMPLIFY YOUR ANSWER.

(a) $\int \frac{\cos x}{1 + \sin x} dx =$ _____

(b) $\int \frac{1}{4x^2 + 9} dx =$ _____

(c) $\int \frac{1}{\sqrt{-x^2 - 2x + 15}} dx =$ _____

4. Use separation of variables to find a particular solution of $y' = \frac{3}{xe^y}$ satisfying the initial condition $y(1) = 2$.

5. Solve the first-order differential equation $y' + 2xy = 4x$.

6. A population of size y is growing exponentially. When $t = 0$, $y = 200$. When $t = 1$, $y = 400$. What is the size of the population when $t = 2$?