

## EXAM 2

### MAT 222

Name \_\_\_\_\_

March 17, 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	30	5	
2	5		
3	5		
4	8		
5	16	8	
6	26	7,7,12	
<b>TOTAL</b>	<b>100</b>		

Please circle your section:

8:00  
Friske

11:30  
Friske

## I. True-False

- T F a.  $\infty \cdot 0$  is an indeterminate form.
- T F b. In the shell method for computing volume, rectangle elements are perpendicular to the axis of revolution.
- T F c. In the disk method for computing volume, rectangle elements are perpendicular axis of revolution.
- T F d.  $\int_1^{\infty} \frac{1}{x^p} dx$  diverges if  $1 < p$ .
- T F e. If  $0 \leq f(x) \leq 1$  for all  $x$ , then  $\lim_{x \rightarrow \infty} \frac{f(x)}{x} = 0$ .

## II. Applications

1. Which integration technique is most appropriate for doing each integral? Some integrals may require two techniques. You may want to show how you would start out if it helps your explanation, but **DO NOT DO THE INTEGRATION!**

complete the square	divide and conquer	I wish it were...	long division
trig identity	use ln	use arc function	u-substitution
by parts	trig substitution	partial fractions	

(a)  $\int \frac{5x}{\sqrt{6-5x^2}} dx$

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

(c)  $\int \frac{x^4 - 3x^2 + 1}{3x^2 + 2x - 3} dx$

(d)  $\int \sin^2 x dx$

(e)  $\int \frac{4x-1}{\sqrt{9+x^2}} dx$

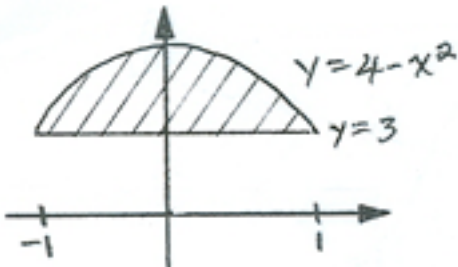
(f)  $\int \frac{x+1}{x^2+4} dx$

2. Do a partial fractions decomposition for this integral. **DO NOT INTEGRATE!**

$$\int \frac{5x^2 - 12x - 12}{x^3 - 4x} dx$$

3. Set up the integral for computing the surface area for the surface of revolution obtained by revolving the graph of  $f(x) = \sin x$ ,  $0 \leq x \leq \frac{\pi}{2}$ , around the x-axis. DO NOT INTEGRATE!

4. Find the volume of the solid formed by revolving the following plane area about the x-axis:



5. Evaluate the following limits. The value of a limit may be a real number,  $\infty$ , or  $-\infty$ . Otherwise, if the limit does not exist, say so.

(a)  $\lim_{x \rightarrow 0} \frac{e^{2x}}{x^2 + 3} =$  \_\_\_\_\_

(b)  $\lim_{x \rightarrow \infty} \left(1 + \frac{3}{x}\right)^x =$  \_\_\_\_\_

6. Evaluate the integral. Use the indicated technique if provided.

(a) complete the square:  $\int \frac{3}{\sqrt{6x - x^2}} dx =$  \_\_\_\_\_

(b)  $\int_0^{\infty} x e^{-x} dx =$  \_\_\_\_\_

(c) trig substitution:  $\int \frac{1}{(4 + 25x^2)^{3/2}} dx = \underline{\hspace{2cm}}$