

Name: \_\_\_\_\_

Instructor: \_\_\_\_\_

**Math 10560, Exam 2.**

**March 21, 2006**

- The Honor Code is in effect for this examination. All work is to be your own.
- No calculators.
- The exam lasts for 1 hour and 15 min.
- Be sure that your name is on every page in case pages become detached.
- Be sure that you have all 9 pages of the test.

PLEASE MARK YOUR ANSWERS WITH AN X, not a circle!					
1.	(a)	(b)	(c)	(d)	(e)
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.....					
3.	(a)	(b)	(c)	(d)	(e)
4.	(a)	(b)	(c)	(d)	(e)
.....					
5.	(a)	(b)	(c)	(d)	(e)
6.	(a)	(b)	(c)	(d)	(e)
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7.	(a)	(b)	(c)	(d)	(e)
8.	(a)	(b)	(c)	(d)	(e)

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Multiple Choice	_____
9.	_____
10.	_____
11.	_____
12.	_____
Total	_____

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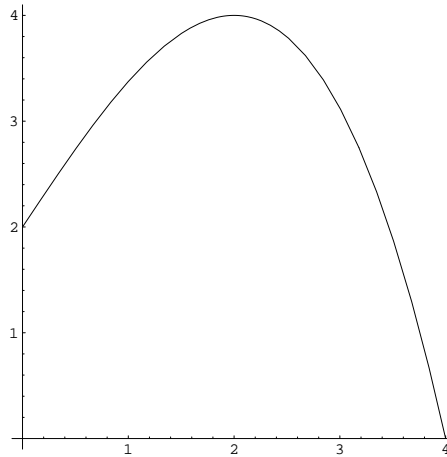
Multiple Choice

1.(7 pts.) Which of the following expressions gives the partial fraction decomposition of the function

$$f(x) = \frac{x^2 - 2x + 6}{x^3(x - 3)(x^2 + 4)}?$$

- (a)  $\frac{A}{x^3} + \frac{B}{x - 3} + \frac{Cx + D}{x^2 + 4}$
- (b)  $\frac{A}{x^3} + \frac{B}{x^2} + \frac{C}{x} + \frac{D}{x - 3} + \frac{E}{x^2 + 4}$
- (c)  $\frac{A}{x^3} + \frac{B}{x^2} + \frac{C}{x} + \frac{D}{x - 3} + \frac{Ex + F}{x^2 + 4}$
- (d)  $\frac{A}{x^3} + \frac{B}{x - 3} + \frac{C}{x^2 + 4}$
- (e)  $\frac{A}{x^3} + \frac{B}{x^2} + \frac{C}{x} + \frac{D}{x - 3} + \frac{E}{x + 2} + \frac{F}{x - 2}$

2.(7 pts.) Use the trapezoidal rule with step size  $\Delta x = 2$  to approximate the integral  $\int_0^4 f(x)dx$  where the graph of the function  $f(x)$  is given below.



- (a) 8                      (b) 6                      (c) 12                      (d) 10                      (e) 14

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3.(7 pts.) Evaluate the following improper integral:

$$\int_e^{\infty} \frac{1}{x(\ln x)^2} dx$$

- (a)  $\frac{1}{e}$       (b)  $-1$       (c)  $1$       (d) divergent      (e)  $0$

4.(7 pts.) Find  $\int_{-2}^2 \frac{1}{x+1} dx$ .

- (a)  $\frac{1}{2} \ln 3$       (b)  $\ln 3$       (c)  $\frac{8}{9}$       (d)  $0$       (e) diverges

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5.(7 pts.) Which of the following is an expression for the area of the surface formed by rotating the curve  $y = 5^x$  between  $x = 0$  and  $x = 2$  about the  $y$ -axis?

(a)  $\int_1^{25} 2\pi y \sqrt{1 + \frac{1}{y^2 \ln(25)}} dy$

(b)  $\int_0^2 2\pi x \sqrt{1 + (\ln 5)^2 \cdot 25^x} dx$

(c)  $\int_1^{25} 2\pi y \sqrt{1 + \frac{1}{y^2 (\ln 5)^2}} dy$

(d)  $\int_0^2 2\pi x \sqrt{1 + 5^{2x}} dx$

(e)  $\int_0^2 2\pi 5^x \sqrt{1 + (\ln 5)^2 \cdot 5^{2x}} dx$

6.(7 pts.) Find the centroid of the region bounded by  $y = 1/x$ ,  $y = 0$ ,  $x = 1$ , and  $x = 2$ .

(a)  $(\ln \frac{1}{2}, 4 \ln \frac{1}{2})$

(b)  $(\frac{1}{\ln 2}, \frac{1}{2})$

(c)  $(\frac{3}{\ln 2}, \frac{1}{4 \ln 2})$

(d)  $(3 \ln \frac{1}{2}, 4 \ln \frac{1}{2})$

(e)  $(\frac{1}{\ln 2}, \frac{1}{4 \ln 2})$

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7.(7 pts.) Use Euler's method with step size 0.5 to estimate  $y(1)$  where  $y(x)$  is the solution to the initial value problem

$$y' = y + 2xy, \quad y(0) = 1.$$

- (a)  $\frac{1}{2}$       (b) 3      (c) 2      (d)  $\frac{3}{2}$       (e)  $\frac{5}{2}$

8.(7 pts.) The solution to the initial value problem

$$y' = \frac{\sin x}{2y + 1} \quad y(0) = 2$$

is given by

- (a)  $y^2 + y = 7 - \cos x$   
(b)  $y^2 + y = 2 - \cos x$   
(c)  $2y + 1 = 5e^{-\cos x}$   
(d)  $2y + 1 = 6 - e^{-\cos x}$   
(e)  $y^2 + y = 5 + \cos x$

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Partial Credit

You must show your work on the partial credit problems to receive credit!

9.(11 pts.) Find the integral

$$\int \frac{3x + 1}{x^3 + x^2} dx.$$

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**10.**(11 pts.) Calculate the integral

$$\int \frac{dx}{x + \sqrt[3]{x}}.$$

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**11.**(11 pts.) Calculate the arc length of the curve if  $y = \frac{x^2}{4} - \ln(\sqrt{x})$ , where  $2 \leq x \leq 4$ .



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**12.**(11 pts.) Solve the initial value problem

$$xy' + xy + y = e^{-x}$$

$$y(1) = \frac{2}{e}.$$

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