MATH 162

Practice Midterm Exam

Exam is Thursday, February 19, 2004
8:00 am in Hubble Aud. (HH 141)

NAME (please print legibly): _____
Your University ID Number: _____
Circle your Instructor's Name along with the Lecture Time:

Mike Gage (10 MWF) Jonathan Pakianathan (9 MWF) Arnie Pizer (2 TR) Colleen Robles (10 MWF)

- **Calculators are NOT allowed on this exam.**
- **Please show all your work. You may use back pages if necessary. You may not receive full credit for a correct answer if there is no work shown.**
- **Please put your final answers in the spaces provided.**

QUESTION	VALUE	SCORE
1	10	
2	5	
3	5	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	10	
11	10	
TOTAL	100	

1. (10 points) A swimming pool has the shape of a cylinder with (horizontal) radius 5 meters and depth 3 meters. Assume that the pool contains water (density 1000 kg/m^3) to a depth of 2 meters. Find the work required to pump all of the water out over the top of the pool. (The acceleration of gravity is $g = 9.8$ m/s^2.)

2. (5 points) Find the area of the region enclosed by the parabola $y = 8 - x^2$ the parabola $y = x^2$.

ANSWER: _____

3. (5 points) What is the volume of the solid obtained by rotating the region bounded by $y = 1/x$, $y = 0$, $x = 1$ and $x = 3$ about the line $y = -1$.

ANSWER: _____

4. (10 points) If 6 J of work is needed to stretch a spring from 10 cm to 12 cm and another 10 J is needed to stretch it from 12 cm to 14 cm, what is the natural length of the spring? (Assume the spring lies along the x axis with it's base at 0.)

ANSWER: _____

Calculate the following integrals. State the method you are using to find the anti-derivative:

5. (10 points)

$$\int_0^1 xe^{2x}\,dx$$

ANSWER: _____

6. (10 points)

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

ANSWER: _____

Calculate the following integrals. State the method you are using to find the anti-derivative:

7. (10 points)

$$\int \sin\sqrt{x}\,dx \qquad x > 0$$

ANSWER: _____

8. (10 points)

$$\int x^{-1}(\ln x)^2\,dx \qquad x > 0$$

ANSWER: _____

Calculate the following integrals. State the method you are using to find the anti-derivative:

9. (10 points)

$$\int (\ln x)^2\,dx$$

ANSWER: _____

10. (10 points)

$$\int \sin^2(x)\cos^2(x)\,dx$$

ANSWER: _____

Calculate the following integrals. State the method you are using to find the anti-derivative:

11. (10 points)

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

ANSWER: _____