MATH 142

MIDTERM EXAM II

April 3, 2003

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

Caulk (9 o'clock) Knightly (10 o'clock) Moustafaev (2 o'clock) Qiu (2 o'clock)

- No calculators are 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.

QUESTION	VALUE	SCORE
1	12	
2	12	
3	16	
4	10	
5	10	
6	12	
7	8	
8	8	
9	12	
TOTAL	100	

1. (12 pts) Find F'(x) for F as given:

(a)
$$F(x) = \int_{-2}^{x} \sqrt{t^2 - 2t + 5} dt$$

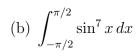
ANSWER: _____

(b)
$$F(x) = \int_0^{x^3} \sec t \, dt$$

2. (12 pts) Evaluate the following integrals.

(a)
$$\int 1 dx$$

ANSWER: _____



ANSWER: _____

(c) $\int \tan x \, dx$

- 3. (16 pts) Find the area of the region(s) bounded by the given functions:
- (a) $f(x) = x^2 4x + 3$ $g(x) = -x^2 + 2x + 3.$

ANSWER: _____

(b) $y = x^3 - 2x$ y = 2x.

4. (10 pts) Find the volume of the solid obtained by rotating the region bounded by the curve $y = x^2$ and the line y = x around the horizontal line y = -1.

5. (10 pts) Find the volume of the solid obtained by rotating the region bounded by the following four lines:

the x-axis, y = x, y = x - 2, and the horizontal line y = 1,

around the x-axis.

6. (12 pts) A cylindrical well is 12 feet deep with a radius of 3 feet. The well contains 9 feet of water, measured from the bottom. How much work is required to pump all of the water up to ground level?

(Recall that water weighs 62.5 lbs/ft^3 .)

7. (8 pts) The wavelength of light emitted by supernova at time t is

$$w(t) = \frac{t^2 + 1}{t^2}$$
 nanometers.

Find the average wavelength between t = 1/2 and t = 2.

8. (8 pts) Evaluate the following integrals.

(a)
$$\int_0^1 x\sqrt{1-x^2} \, dx$$

ANSWER: _____

(b)
$$\int t\sqrt{t-4} \, dt$$

9. (12 pts) Evaluate the following integrals.

(a)
$$\int x e^{-2x} dx$$

ANSWER: _____

