

Math 125 F - Autumn 2006
Mid-Term Exam Number One
October 19, 2006

Name: _____

Section: _____

1	15	
2	15	
3	10	
4	10	
5	10	
6	15	
Total	75	

- Complete all questions.
- You may use a calculator, and you should have one, during this examination. Other electronic devices are not allowed, and should be turned off for the duration of the exam.
- You may use one double-sided, hand-written, 8.5 by 11 inch page of notes.
- Show all work for full credit.
- You have 80 minutes to complete the exam.

1. Evaluate the following integrals:

(a) $\int_0^4 |2x - 6| dx$

(b) $\int_0^1 (x + 1)(x - 2) dx$

(c) $\int_1^2 \frac{x^2 + \sqrt{x}}{x} dx$

2. Evaluate the following integrals:

(a) $\int x^2 \sqrt{x+3} dx$

(b) $\int \cos(3x - 8) dx$

(c) $\int \frac{\tan(\ln x)}{x} dx$

3. Use the Midpoint Rule with $n = 4$ to approximate the value of

$$\int_1^2 \sin(x) \log(x) dx$$

You should give a numerical answer.

4. Suppose $f''(x) = \frac{1}{x^2}$, $f'(1) = 2$ and $f(-2) = 1$. Find $f(x)$.

5. Matt wants to dig a cylindrical hole. The hole will be 4 meters wide and 5 meters deep. Assume the dirt in the hole has a density of 1400 kg/m^3 .
- (a) Calculate the amount of work needed to dig the hole.

- (b) Suppose Matt decides he only wants to expend half the amount of work needed to dig a 5 meter deep hole. How deep a hole can he dig? Assume he wants it cylindrical and 4 meters wide.

6. Consider the region in the first quadrant bounded by $y = \frac{1}{x}$, $y = \frac{1}{9}x$, and $x = 1$.

(a) Find the area of the region.

(b) Find the volume of the solid of revolution created when this region is revolved about the line $y = 0$.

(c) Find the volume of the solid of revolution created when this region is revolved about the line $x = -2$.