

Math 125 F - Autumn 2006
Mid-Term Exam Number Two
November 16, 2006

Name: _____

Section: _____

1	10	
2	10	
3	10	
4	10	
5	5	
6	10	
Total	55	

- 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) $\int \tan^5 x \sec^6 x \, dx$

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

2. Evaluate the following integrals:

(a) $\int \frac{(\ln x)^2}{x^3} dx$

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

3. Evaluate the following integrals:

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

(b) $\int \frac{\sqrt{x^2 - 1}}{x} \, dx$

4. Evaluate the following integrals:

(a) $\int_{-\infty}^{\infty} \frac{dx}{x^2 + 4x + 11}$

(b) $\int_1^{\infty} \frac{dx}{2x^2 + x}$

5. Approximate the integral

$$\int_2^3 \ln x \sin x \, dx$$

using Simpson's rule with $n = 4$. Maintain at least four digits of precision throughout.

6. It takes twice as much work to stretch a certain spring from a length of 11 cm to a length of 12 cm as it does to stretch it from a length of 8 cm to a length of 9 cm.
What is the natural length of the spring?