

MthU242  
Northeastern University  
Quiz #5  
20 Minutes

Valentine's Day

Calculus II  
Professor Gilmore  
Feb. 14, 2008

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

Show All Your Work

1. In Problem #1, **draw a picture** in both parts.
- A spring has a natural length of 10 cms. It takes 8 Joules of work to stretch it from its relaxed state to a length of 30 cms. How much work does it take to stretch this spring from 30 cms. to 40 cms?

- A rectangular tank is half filled with water. Its dimensions are 10 meters long, 6 meters wide and 8 meters deep. The density of water is 1,000 kg. per cubic meter. Set up an integral to calculate the amount of work needed to pump all of the water out of this tank, **BUT DO NOT EVALUATE IT.**

2. Do the following sequences converge or diverge? If one converges give the number.

- $a_n = \frac{2^n n^3 + 35}{100 - 3^n n^3}$

- $a_n = \frac{n^5}{n!}$