Math 113-008, Exam 1	L
21-24 September 2007	
D. G. Wright	

Name	
$Row_{-}$	

1. (20%)

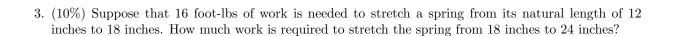
(a) Carefully sketch the region between the curves  $y=x^2$  and y=x+2. The rest of the problem depends on this sketch.

(b) Set up an integral for the area of region bounded by the curves in part (a). DO NOT EVALUATE THE INTEGRAL!

(c) Set up an integral for the volume when the region is rotated about the x-axis. DO NOT EVALUATE THE INTEGRAL!

(d) Set up an integral for the volume when the region is rotated about the line x = 2. DO NOT EVALUATE THE INTEGRAL!

2. (10%) Show that the volume V of a cone with radius r and height h is given by  $V = \frac{1}{3}\pi r^2 h$ .



4. (10%) A tank has the shape of a surface generated by revolving the parabolic segment  $y=x^2$  for  $0 \le x \le 3$  about the y-axis (measurement in feet). If the tank is full of a fluid weighing 100 pounds per cubic foot, set up an integral for the work required to pump the contents of the tank to a level 5 feet above the top of the tank. DO NOT EVALUATE THE INTEGRAL!

5. (10%) Find the average value of the function  $f(x) = x^2$  for  $1 \le x \le 3$ .

6. (40%) Evaluate the following integrals:

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

(b) 
$$\int e^{2\theta} \sin 3\theta d\theta$$

(c) 
$$\int \sin^5 x \cos^2 x \ dx$$

$$(d) \int_0^\pi \cos^4 2x \ dx$$