Math 001B Assignment 6.4 Name________________________

DIRECTIONS To receive full credit, you must provide complete legible solutions to the following problems in the space provided. Transfer all your answers to the space provided on the test paper. A set up includes a graph of the region, choice of a differential strip, the volume element and an expression for the volume elements including limits.

1. The table shows values of a force function f(x), where x is measured in meters and f(x) in newtons. Use the Midpoint Rule with n = 4 to estimate the work W done by the force in moving an object from x = 5 to x = 37.

x	5	9	13	17	21	25	29	33	37
f(x)	5	5.8	7.1	8.6	9.7	8.1	6.7	5.5	4.1

2. Suppose that 6 J of work is needed to stretch a spring from its natural length of 32 cm to a length of 46 cm.

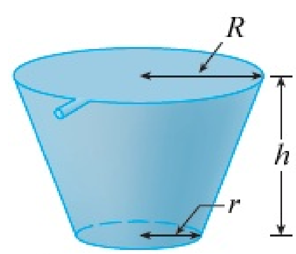
a. How much work is needed to stretch the spring from 37 cm to 42 cm? (Round your answer to two decimal places.)

b. How far beyond its natural length will a force of 40 N keep the spring stretched? (Round your answer one decimal place.)

3. If 54 J of work are needed to stretch a spring from 18 cm to 24 cm and 90 J are needed to stretch it from 24 cm to 30 cm, what is the natural length of the spring?

4. A leaky 10-kg bucket is lifted from the ground to a height of 16 m at a constant speed with a rope that weighs 0.8 kg/m. Initially the bucket contains 48 kg of water, but the water leaks at a constant rate and finishes draining just as the bucket reaches the 16-m level. Set up an integral for the work done then use a calculator to find its value. (Use ρg for the weight density of water.)

5. A tank is full of water. Set up an integral for the work done required to pump the water out of the spout then use a calculator to find/approximate its vale. (Use ρg for the weight density of water.) (Assume r = 6 ft, R = 12 ft, and h = 20 ft.)



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