MAT 161 Test 4 Name _____
Spring 2016

Show all work for credit purposes.

1. Evaluate the Riemann sum for $f(x) = 200x - x^2$ on $6 \le x \le 12$, with three subintervals, taking the sample points to be the midpoints.

2. Calculate $\lim_{n\to\infty} \sum_{k=1}^{n} \left(1 + k\,\frac{4}{n}\right)^3 \left(\frac{4}{n}\right)$ by evaluating the equivalent integral.

3. Find the area from $x = 2$ to $x = 4$, between the *x*-axis and the curve $y = 2x + \sin(\pi x)$.

4. Find the average value of $f(x) = 6x + 5e^x$ on the interval [1, 3].

5. Calculate the area bounded by the curves $y = 0.1x^2$ and y = x.

6. A 300-lb. cable is 100 ft. long and hangs vertically from the top of a tall building. How much work is required to lift the cable to the top of the building?

7. Find the derivative of $F(x) = \int_{-1}^{4x} \sin(\cos(6t) + 5)\ dt$

8. Calculate the following.

a. $\int\left(\frac{x}{36+x^2}\right)dx$

b. $\int \cos(x)\ \sec^2(\sin(x)\ +3)dx$

c. $\int_0^2 x^2(3x^3+7)^4\,dx$