MAT 132

Winter 1988

Show all work for credit. Do all your work neatly on the paper provided. Write your name on each sheet you turn in. I will **not** grade any work done on the test sheet. When you are finished turn in all sheets including the test. Good Luck.

1. Approximate the area of the region bounded by $y = 4x$, the x-axis, the line $x = 0$, and the line $x = 2$. Divide the interval $[0, 2]$ into 4 subintervals of equal length and use a convenient point in each subinterval, to determine the areas of the chosen collection of rectangles.

2. Evaluate the following sums:

   (a) $\sum_{j=1}^{3} j^3$ (b) $\sum_{j=3}^{5} \frac{j}{j+1}$

3. Evaluate the following integrals:

   (a) $\int \left(\frac{-3}{x^{\frac{3}{11}}} + \frac{2}{x^{\frac{3}{9}}} \right) dx$

   (b) $\int_2^3 (s-1)(s-2)ds$

   (c) $\int_4^9 \frac{x+1}{\sqrt{x}} dx$

   (d) $\int_{-2}^{1} |x| dx$

   (e) $\int (\sec^2 x - \sec x \tan x) dx$

4. Let $F(x) = \int_1^{x^2} \frac{1}{t^2} dt$. Find $F'(x)$.

5. Carry out the indicated integration (Use substitution when necessary)

   (a) $\int x^2 (11 + 2x^3)^{\frac{1}{3}} dx$

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

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

6. Find the area bounded by $y = (x-1)^2 + 2$, the x-axis, the line $x = -1$, and the line $x = 3$.

(BONUS 5pts) Let $L(x)$ be a function which has the property that $L'(x) = \frac{1}{x}$. Find $\int \frac{\sin x}{\cos x} dx$ in terms of L.