EXAM 1
Math 2423
2-13-04

Name _____

Row _____

Instructions   *Work all of the following problems in the space provided. If there is not enough room, you may write on the back sides of the pages. Give thorough explanations to receive full credit.*

1. *(8 points)* Give the definition of the definite integral $\int_a^b f(x)\, dx$ as a limit of sums. Remember to explain the meaning of the symbols you use.

2. *(10 points)* Evaluate the Riemann sum for $f(x) = x^2$, $0 \le x \le 8$, with four subintervals, taking the sample points to be midpoints.

3. *(12 points)* Find $\dfrac{d}{dx} \displaystyle\int_0^{\tan x} \dfrac{\cos(t)}{t}\, dt$.

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4. *(24 points)* Find the indefinite integral, showing all work:

a) $\displaystyle \int x^4 \sqrt{x^5 + 1}\ dx$

b) $\displaystyle \int x^9 \sqrt{x^5 + 1}\ dx$

5. *(24 points)* Find the value of the definite integral, showing all work.

a) $\displaystyle \int_0^1 \frac{x^2}{(x^3 + 10)^4}\ dx$

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b) $\displaystyle\int_0^{\pi/6} \sec^7 x \tan x \; dx$

6. *(22 points)* For each of the two figures below, find the area of the shaded region.

a)

b)