

MATH 20
TEST #1 SAMPLE

NOTE: This is a sample to give you an idea of the types of questions that might be on your TEST 1.

There are a total of 6 problems on 4 pages. Please be sure that you have the entire test. Also, show all necessary work; answers that seem to appear by magic will receive no credit.

1. Differentiate the following functions:

a. $f(x) = \frac{x^2}{x+2}$

b. $y = \ln(3x^2 + e^{5x})$

2. Use **geometry** to evaluate the definite integral $\int_2^6 (2t+1)dt$.

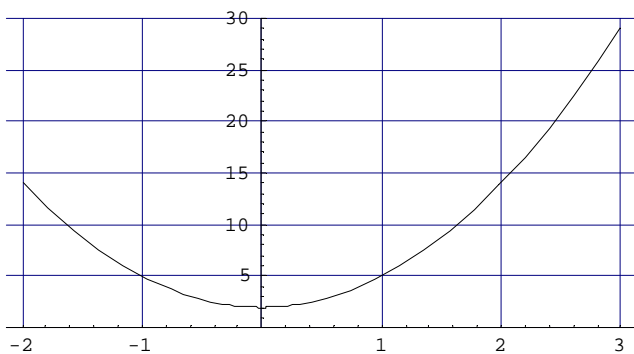
3. Find each of the following antiderivatives:

a. $\int \left(\frac{5}{y^2} - 4y^2 \right) dy$

b. $\int (x+3)(x^2 + 6x + 2)^4 dx$

c. $\int \frac{\sqrt{x^{1/2} - 3}}{\sqrt{x}} dx$

4. The following is a graph of $f(x) = 3x^2 + 2$ on the interval $[-2, 3]$.



- For $n = 5$, clearly and carefully, draw the right-hand rectangles on the graph.
- Find the right-hand sum.
- If $v = f(t)$ is a velocity in feet per second and t is time in seconds, what does the answer to part b tell us?

5. Use the Fundamental theorem of calculus to evaluate $\int_{-1}^1 (2x+1)^3 dx$.

6. Find the average value of the function $f(x) = x^2$ on the interval $[0, 4]$.

7. Find the area enclosed by the curves $x = x$, $y = 1/x$, $x = e$ and $x = e^2$.