

Math 141.1 – Test III
Tuesday, Nov. 23, 1993

Name _____

Directions: Show your work for full credit. If you need extra room, use the back of the opposite page, clearly indicating the problem number and your answer.

1. Determine if the following limits exist and if so their value:

(a) $\lim_{x \rightarrow \infty} \frac{3x^2 + 5 - \frac{2}{x}}{(x + 3)^2}$

(b) $\lim_{x \rightarrow 2^+} \frac{x + 2}{x^2 - 4}$

2. Find an intermediate value c to verify the Mean Value Theorem for $f(x) = x^2 + 3x - 2$ on the interval $[1, 3]$.

3. Determine antiderivatives for each of the following functions:

(a) $\frac{5x^2 - 1}{3x^2}$

(b) $\sqrt{x - 2}$

4. Compute the integrals

(a) $\int_1^2 4x(x^3 - 2x) dx$

(b) $\int x^2 \sin(x^3 + 1) dx$

5. Evaluate each of the sums

(a) $\sum_{j=2}^4 (3j^2 - j + 1)$

(b) $\sum_{j=1}^{40} (2j - 1)$

6. Compute the area of the circumscribed rectangles using the function $f(x) = 2x^2 - 3$ over the interval $[0, 2]$ using a uniform partition with $n = 4$.

7. Compute the area between the curve $y = \sin(x)$ and the x -axis over the interval $[0, \pi]$.

Extra Credit: Use 3 iterations of the Newton-Raphson algorithm to approximate $\sqrt[3]{3}$ with a starting value of $x_0 = 1$.