

MATH 20C: FUNDAMENTALS OF CALCULUS II
EXAM #1

Name _____

Please complete the following problems in the space provided. You may use an approved calculator. Please include all relevant intermediate calculations and explain your work when appropriate. Be neat and orderly in your answer. Each problem is worth 5 points, except for the last problem which is worth 10 points.

Problem 1.

(a) Evaluate the integral

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

(b) Evaluate the integral

$$\int x \left(x^{1.5} - x^{-1} + \frac{3}{x^2} \right) dx.$$

Problem 2. The slope of the function $f(x)$ at the point $(x, f(x))$ is equal to $9 - e^x$ and $f(0) = 1$. Find the function $f(x)$.

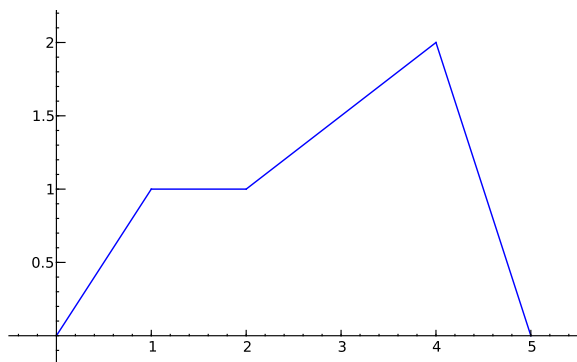
Problem 3. Evaluate the integral

$$\int \frac{x^2}{(x^3 - 7)^{0.7}} dx.$$

Problem 4. Evaluate the integral

$$\int (2x - 3)e^{2x^2 - 6x} dx.$$

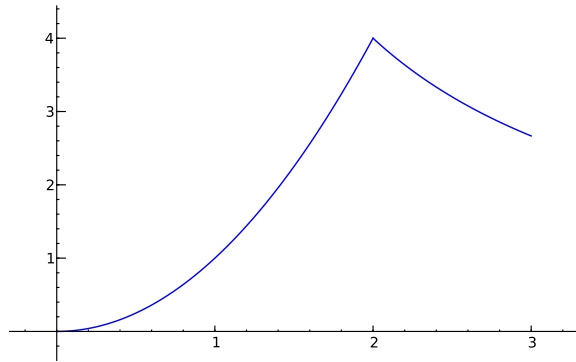
Problem 5. Use the following graph of $f(x)$ to compute $\int_0^5 f(x) dx$.



Problem 6.

- (a) Calculate the left Riemann sum to approximate $\int_0^3 \frac{1}{1+2x} dx$ using $n = 3$ subdivisions.

- (b) Draw the rectangles representing the left Riemann sum for the following function $f(x)$ on the interval $[0, 3]$ using 6 subdivisions.



- Problem 7.** Compute the area under the graph of $f(x) = x(x^2 - 1)^4$ between $x = 0$ and $x = 1$.

Problem 8. Evaluate the definite integral

$$\int_1^e \left(2x + \frac{2}{x} \right) dx.$$

Problem 9 (10 points). A book publisher declares that the marginal cost to produce x books is

$$C'(x) = 10 - 500 \frac{x}{(x+1)^3}$$

dollars, and that the fixed cost is 500 dollars. What is the cost function $C(x)$?