

Math 108H Exam 2

Name _____.

Show all work, no calculator

1. (18 points) Evaluate each of the following integrals:

a. $\int (x\sqrt{x} - \frac{1}{x^3}) dx$

b. $\int_0^4 e^{3x} dx$

c. $\int \frac{2x}{x^2-4} dx$

2. (16 points) Find the extreme values of $f(x) = 8x^2 - x^4 + 3$ on the interval $[-1, 3]$.

3. (16 points) A two-pen corral is to be built. The outline of the corral forms two identical adjoining rectangles. If there is 120 feet of fencing available, what dimensions maximize the enclosed area.

4. (17 points) Given $f(x) = x^5 - 5x^4$. Find intervals on which $f(x)$ is increasing, decreasing. Find intervals where the graph of $y = f(x)$ is concave up, concave down. Classify all critical points. Find all points of inflection.

5. (16 points) Find the area bounded by the curve $y = f(x) = x^2 - 2x$ and the x -axis between $x = 0$ and $x = 4$.

6. (17 points) Assume the interval $[0, 2]$ is divided into n equal subintervals. Express the sum of the values of the function $f(x) = x^2 - 3x + 4$ at the right endpoint of each subinterval as a sum using the Σ notation. Then evaluate this sum getting your final answer in terms of n .