

Name:

MATH 192 Final Exam Hand Portion

Show all work to receive credit. Calculators are not permitted on this portion of the exam. You are encouraged to turn in this portion of the exam and receive the calculator portion after 1 hour; you are strongly encouraged to make the switch after 1 hour and 15 minutes; you are required to turn in this portion of the exam, and receive the calculator portion, no later than 1 hour and 30 minutes into the examination.

1. Compute as requested:

a) Find the equation of the tangent line to the graph of $y = 3x^2 - 2x + 4$ at $x = 2$.

b) Find $\frac{d}{dx}(2x + \sqrt{x} - e^x)$.

c) Find $\frac{du}{dx}$ if $u = (x + 1)^{12} \ln(x)$.

d) Find $f'(x)$ if $f(x) = e^{3x^2} + \sqrt[3]{x^2 + 1}$.

e) Find $f(x)$ if $f'(x) = -3e^{2x}$ and $f(0) = 1$.

f) Compute $\int_1^3 x^3 - 2x^2 + 5 dx$.

g) Compute $\int \frac{1}{x} + (1 + 3x)^2 dx$.

2. Find the average value of $4x^2$ on the interval $[1, 5]$.

3. Find the area between the graphs of $f(x) = 2x + 1$ and $g(x) = x^2 + 1$.

4. Sketch, on the axes provided, a clear graph of a function that is defined at $x = 2$, has a left hand limit at $x = 2$, and has a right hand limit at $x = 2$, but has no limit at $x = 2$.

5. Sketch the graph of f defined by $f(x) = 5x^3 - 3x^5$. List the coordinates of where extrema and points of inflection occur, and label them on your graph. State where the function is increasing or decreasing, as well as where it is concave up or concave down.

6. Find the absolute maximum and minimum values of f defined by $f(x) = x^3 - 6x^2 + 10$ on the interval $[-3, 5]$ and indicate the x -values at which they occur.