

YOUR NAME: _____

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Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Compute the derivatives:

(a) $[e^{7x} \ln(x^2 + 1)]' =$

(b) $[(e^{2x} + 3x^5 + \ln x)^3]' =$

2. Compute the integrals:

(a) $\int (21\sqrt{x^5} + \frac{6}{\sqrt[5]{x^2}}) dx =$

(b) $\int (6e^{3x} + 18x^5) dx =$

(c) $\int \frac{(x+2)(x-4)}{x^2} dx =$

3. According to a price model, the average price for an ice cream cone in Sault Sainte Marie was increasing at the rate of $18e^{0.09t}$ cents per year, where t stands for years since 2010.

(a) If the average price of a cone was \$3 in 2010, find an equation for the price $p(t)$ t years from 2010.

(b) When does your model predict that the price of a cone would reach \$5?

4. Compute the area of the region between the curves $f(x) = 3x^2 - x - 1$ and $g(x) = 5x + 8$.

5. Evaluate the integrals:

(a) $\int \sqrt[3]{x^5 - 10} x^4 dx$

(b) $\int x^5 \ln x dx$