EXAM 4 - MATH 112 Friday, April 20

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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 following derivatives:

   (a) $[x^2e^{3x} - (3x + \ln x)^7]' =$

   (b) $\left[\dfrac{3e^{5x}}{1 + e^{-2x}}\right]' =$

2. Compute the integrals:

   (a) $\displaystyle\int \frac{2x^5 + x^3e^{9x} - x^2}{x^3}dx =$

   (b) $\displaystyle\int \frac{6x^3 + \sqrt{x^3} - 1}{\sqrt{x^5}}dx =$

3. The price of an ice-cream cone at a certain store in the Soo is increasing at the rate of $18e^{0.1t}$ **cents** per year, where t is the number of years since the store's opening in 2010.

   (a) If in 2010, when the store opened, the price was set at \$4.00, what would the price be t years after 2010?

   (b) Assuming the store stays open in the foreseeable future, when is the price of the ice-cream cone predicted to reach \$7.00?

4. A model giving the sales of apple computers immediately following the turn of the millennium is

$$S(x) = 2x^2 - 9x + 39 \text{ hundeds thousands.}$$

where x is the number of years since 2000.

What were the average sales from 2000 to 2006?

5. Find the area of the region enclosed by the graphs of $f(x) = x^3$ and $g(x) = 4x$.