EXAM 4 - MATH 112 Friday, April 18

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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) $f(x) = x^2 e^{5x} - 2\ln x + (x^2+1)^3$

   (b) $f(x) = x^2 \ln(x^4+7) + e^{x^2}$.

2. Compute the following integrals.

(a) $\int (5x^4 - 12x^3 + 9x^2 - 1)dx$

(b) $\int \left(\sqrt[3]{x^5} - \frac{3}{\sqrt[5]{x^2}} \right) dx$

(c) $\int \frac{8x^5 - 10x^3 + 7x^2 - 5x}{x^2} dx$

3. A pint of lager is chilled at 40° F. Because of the pub's ambient temperature, it is warming at the rate of $80e^{-\frac{5}{2}t}$ degrees per hour.

   (a) Find an equation for its temperature $T(t)$ after t hours.

   (b) When will its temperature be 56° according to your model? Please, give your answer in exact form first, before approximating.

4. Find the area of the region enclosed by the curves $f(x) = x^2 + 5x$ and $g(x) = 7x$.

5. Find the average value of $f(x) = 2x - \frac{1}{x}$ over the interval $[1, 3]$