

Applied Calculus – Make Up Exam 3

- Sufficient work must be shown to receive any credit.
 - Attach more papers to show your work if needed.
1. Given $x^3 - 5xy - y^3 = 2x$, use implicit differentiation to find $\frac{dy}{dx}$.
 2. The volume of a cantaloupe is given by $V = \frac{4}{3}\pi r^3$. The radius is growing at the rate of 0.2 cm/week at a time when the radius is 5 cm. How fast is the volume changing at that moment?
 3. Find the equation of the line tangent to the graph of $f(x) = 2 \ln(4 - 3x)$ at the point $(1, 0)$.
 4. Differentiate: $g(x) = e^{\sqrt{2-3x}} + \sqrt{5x + e^{4x}}$
 5. Differentiate: $g(x) = \ln(3 + x^4)^5 + (\ln 3x)^4$
 6. Differentiate: $f(x) = \ln(e^{5x} + 6x) + \ln(\ln(3x))$
 7. Differentiate: $f(x) = 2^{x^3-4x} + \ln\left(\frac{5x+6}{4x+5}\right)$
 8. Compute $\int \left(\frac{2}{\sqrt[5]{x^4}} - \frac{e^{2x}}{3} \right) dx$
 9. Compute $\int \frac{6x^3 + x^2 - x - 2}{x^2} dx$
 10. If $f'(x) = 10x^4 - 6x$ and $f(1) = 3$, find $f(x)$.