

Answer All Questions on your own paper. **Show your work. Use one side of your paper only.** Be neat and logical in the presentation. What you turn in should NOT be your first draft. It should reflect your best effort; it should not just be something you throw together at the last minute. Credits are as indicated. Do not turn this sheet in with your work.

1. Find each limit: a) $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x^2 + 5x - 6}$ b) $\lim_{x \rightarrow 9} \frac{\sqrt{x} - 3}{x - 9}$ (+5 each)
2. Use the four-step process to find the derivative of $f(x) = 2x^2 - x + 5$ (+9)
3. Find the derivatives of each of the following (you may use the derivative formulas):
- a) $f(x) = 14x^5 + 5x^4 - 2x^3 + 4x^2 + 14x - 55$ (+2)
- b) $f(x) = \frac{3}{x^4}$ (+2)
- c) $f(x) = \sqrt[3]{x^2}$ (+2)
- d) $f(x) = (x^3 - 2x^2)(4x - 5)$ (+5)
- e) $f(x) = \frac{x^2 - 3x - 10}{x - 5}$ (+5)
- f) $f(x) = (x^2 - 2x + 3)^3$ (+5)
4. Find the INSTANTANEOUS RATE OF CHANGE of $f(x) = \frac{x}{2x - 3}$ when $x = 2$ (+6)
5. Write an equation of the tangent line to $f(x) = \frac{2x + 1}{x^2}$ at the point $(2, f(2))$. (+8)
6. The Buffalo Computer Company realizes a monthly revenue of $R(x) = 8000x - 100x^2$ dollars when the price charged per computer is x dollars.
- a) Find the marginal revenue, R' (+2).
- b) Find $R'(39)$, $R'(40)$, and $R'(41)$ (+1 each)
- c) Interpret your results in part b). (+2)
7. Find $\frac{d^2}{dx^2} \left(\frac{2x + 1}{x} \right)$ (+7)
8. Find $\frac{dy}{dx}$ implicitly: $x^3 + y^3 + y = 4$ (+7)