Calculus I Test 2. February 21, 2003   NAME:_____

PART I. Find the derivative $y' = \frac{dy}{dx}$ of each of the following functions. Do basic simplifications only (simple additions, multiplications, and combining like terms). Parentheses must be correctly placed.

1. $y = x^4 - 5x^3 + x^2 - 7x + 8$
2. $y = \sqrt[3]{x}$
3. $y = \frac{x^2}{1+x^3}$
4. $y = \left(5 + 3x + x^2\right)^8$
5. $y = x^3 \sin(x)$
6. $y = \ln\left|2 + 5x + x^2\right|$
7. $y = \sin(\tan(x))$
8. $y = \cos(10x + \sqrt{3})$
9. $y = \sin^{-1}(5x)$
10. $y = xe^{3x}$
11. $y = x\sqrt{1 + x^2}$
12. $y = \log_3(x)$

PART II. Do as instructed.

13. Find the equation of the line tangent to the graph of $y = \frac{e^{5x}}{1+e^{5x}}$ at the point $(x, y) = (0, \frac{1}{2})$. Simplify your answer.

14. Let $g(x) = \tan^{-1}(x)$. Find $g''(3)$.

15. Use implicit differentiation to find $y' = \frac{dy}{dx}$ if x and y satisfy $x^3 + 2xy + y^3 = 4$.