Name:_____

Calculus I; Fall 2007, Exam III

Part I

Part I consists of 6 questions, each worth 7 points. Clearly show your work for each of the problems listed.

Find y' if:

(1) $y = x\tan^{-1}(x)$

(2) $y = \frac{x}{\ln(x)}$

(3) $y = x^2 e^{x^3}$

(4) $y = \ln(\sin(x))$

(5) Evaluate the limit

$$\lim_{x \to 5} \frac{\cos(x)}{x^2 + 1}$$

(6) Evaluate the limit

$$\lim_{x \to \infty} \frac{e^x + x}{e^{2x}}$$

Part II

Part II consists of 5 problems each worth 12 points. You must show the relevant steps (as we did in class) and justify your answer to earn credit. Simplify your answer when possible.

(1) Find y' if $y = x^3 \sin^{-1}(x^2)$

(2) Find y' if $y = x^{\sin(x)}$.

(3) Find y' if $y = \frac{(\sin(x))^3(x)^5}{(7x+8)^9}$

(4) Simplify $y = \cos(\tan^{-1}(x))$, then find y'.

(5) Use a linear approximation of the function $y = f(x) = \sqrt{x}$ at an appropriate point $x = a$ to estimate the value of $\sqrt{101}$.