Math 1251 Exam 1 January 27, 1995 Your Name _____
Professor Stanton

Directions: You may use your notes, books, and calculators. This exam has 8 problems with the point values indicated. Circle your answer to the multiple choice questions. If you use a table (or calculator) to find your answer, write down the word "table" (or "calculator") next to your answer. If your answer is correct, you will receive full credit for that problem, otherwise you will be awarded 0 points. This means if you copy a minus sign incorrectly you will be given 0 points. An answer alone with no justification is worth 0 points.

(10) 1. If $f(x) = (5 - 2/x)^{100}$, then $f'(x) =$
(a) $100(5 - 2/x)^{99}$
(b) $200(5 - 2/x)^{99}/x$
(c) $400(5 - 2/x)^{99}/x^2$
(d) $1000(5 - 2/x)^{99}$
(e) none of the above.

(10) 2. If $y = tan(x)/x^2$, then $\frac{dy}{dx}=$
(a) $sec(x)/x^2$
(b) $sec^2(x)/x^2 + sin(x)/(2x)$
(c) $tan(x)/(2x)$
(d) $-2tan(x)/x^3 + sec^2(x)/x^2$
(e) none of the above.

(10) 3. If $f(x) = \sqrt{1 + cos(x^2)}$, then $f'(x) =$
(a) $(1 + cos(x^2))^{-1/2}/2$
(b) $\sqrt{|sin(x^2)|}$
(c) $\frac{-x\,sin(x^2)}{\sqrt{1+cos(x^2)}}$
(d) $-sin(x)$
(e) none of the above.

(10) 4.

$$\lim_{x\to 0} \frac{xtan(x)(x^6 + 12)(cos(sin(x))}{sin(2x)sin(3x)(x^{12} + 14x^5 + 3x + 1)} =$$

(a) 0
(b) 12
(c) 3
(d) 2
(e) does not exist.

(12) 5. Find the equation of the tangent line to the graph of $y = x\sqrt{x} + x$ at $(4, 12)$.

(12) 6. The position function of a particle is given by $s = 4t^3 - 12t$.
(a) Find the average velocity during $1 \leq t \leq 3$.
(b) Find the instantaneous velocity at $t = 3$.

(8) 7. Give an example of a function $f(x)$, which is continuous at all real numbers x, but is not differentiable at integer values of x.

(8) 8. True or False. (You must give at least one reason for your answer in a complete sentence. An answer alone is worth zero.)
If $f(x)$ is a continuous function for all real x which satisfies $0 \leq f(x) \leq 1$, then $\lim_{x\to\infty} f(x)$ must exist.