Math 9A First Midterm Fall 2003

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Math 9A Midtem

- This is a close book exam. The total points are 100+10.
- In each problem, you have to show every step of your calculation.

Name:_____

ID Number:_____

1. (15 points) Find following limits:
   (a) $\lim_{x\to\frac{\pi}{2}} x^2 \sin x$.
   (b) $\lim_{x\to 2} x^2 + x^3 - 4$.

2. (20 points) Are following functions continuous at 0?

   (a) $f(x) = \frac{x^2-2x}{\sqrt{x+4}-2}$.

   (b) $f(x) = \frac{x}{\sin x} + 10x^2$.

3. (15 points) Find following derivatives:

   (a) $\sin x + \tan x$.

   (b) $3x(2003x^2 + 9)^{-\frac{1}{2}}$.

4. (15 points) Find the tangent line of the graph of $y = x^5$ at point $x = 1$.

5. (20 points) If the position function is $s(t) = \tan(9t) + 2003t$, what are the velocity and the acceleration at time $t = 0$?

6. (15+10 points) Find the derivative of the implicit function y to the free variable x at $x = 1$ near point $(1, 1)$ if $x^2 + 3y^2 = 4$. (bonus problem) If both x and y are functions of t and $x(1) = y(1) = 1 = y'(1)$, what is $x'(1)$?