Math 9A Second Midterm Fall 2003

Guan

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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 the extrema of $f(x) = x^3 + 2x^2 - 9$ on [-9,9].

2. (20 points) Find the intervals on which the functions are concave upward and the intervals on which the functions are increasing. Find all the asymptotes.

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

   (b) $f(x) = x + 10x^2 - 9$.

3. (15 points) Apply the mean value theorem to $f(x) = x + x^2$ on [1,4].

4. (15 points) Find $\lim_{x\to\infty} \frac{x^2+x}{1+2x-3x^2}$.

5. (20 points) Find the dimension of the smallest area for a page with 24 square inches print and 0.8 inches margin on the top and the bottom, 0.6 inches margin on the left and the right.

6. (15+10 points) Find the differential of the function $f(x) = x^{\frac{4}{3}} - 9$ and apply your solution to estimate $(8.1)^{\frac{4}{3}} - 9$. (bonus problem) If we apply the Newton's method to find a zero in (0, 8) and we let $x_1 = 4$, what will be x_2?