MATH 1100-001
REVIEW PROBLEMS FOR EXAM 1

Reminder:. Exam 1 will cover sections 9.1 through 9.7 of the text, and will be in class on Wednesday, September 23. On the exam you will be allowed one side of a 8.5 by 11 inch sheet of notes. Calculators and other electronic devices are not allowed. The following pages have problems taken from an exam by another instructor in a previous year. If these problems were on an exam, you would have to show your work for full credit. This should not be considered a "practice exam", though exam problems could be similar to some of these, and these make for good review problems. Solutions will be posted sometime on Monday.

1. (5 pts each) For $f(x)=\frac{x-3}{9-x^2}$, answer the following questions.

(a) $\lim_{x\to 3} f(x)$ = _____

(b) $\lim_{x\to -3} f(x)$ = _____

(c) $\lim_{x\to 0} f(x)$ = _____

(d) Where is $f(x)$ discontinuous?

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2. (5 pts each) Find the following limits.

(a) $\lim_{x\to-\infty} \frac{x^2+5x-3}{2x^2+7x}$ = _____

(b) $\lim_{x\to\infty} \frac{x^3+x-2}{3x^5+4x^2+1}$ = _____

3. (12 pts) Use the **definition of the derivative** to find $f'(x)$ for $f(x)=x^2+3x$.

$f'(x)$ = _____

4. (6 pts each) Suppose the total cost of producing x bicycles is given by $C(x)=5000+40x+0.5x^2$.

(a) How fast is the Cost changing with respect to the number of bicycles produced?

Answer: _____

(b) What is the rate of change of the Cost function when 10 bicycles are produced?

Answer: _____

5. (5 pts each) Find y' for the following functions. **(Do NOT bother to simplify!!!)**

(a) $y=\sqrt[3]{x}-\frac{5}{2x^2}+4x-7x^{-1}$

y' = _____

(b) $y=(4x^4+x^2)\left(5x+\frac{1}{x^{2/3}}\right)$

y' = _____

(Note: This is #5 continued.)

Find y' for the following functions. **(Do NOT bother to simplify!!!)**

(c) $y = \dfrac{2x^3 - 1}{5x^3}$

$y' =$ ____________________

(d) $y = \sqrt{5x + 3x^3}$

$y' =$ ____________________

~~6. (10 pts) Find the second derivative of $f(x) =$ [illegible].~~

second derivative: ____________________

7. (16 pts) For $f(x)=3x(x^2-4x)$, find the equation of the tangent line to the curve at x = -1.

Tangent Line: _____