## 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) 
$$\lim_{x \to \infty} \frac{x^3 + x - 2}{3x^5 + 4x^2 + 1} =$$
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3. (12 pts) Use the **definition of the derivative** to find f'(x) for  $f(x)=x^2+3x$ .

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

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

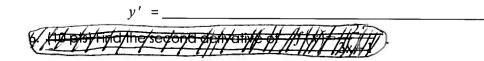
(b) 
$$y = (4x^4 + x^2) \left( 5x + \frac{1}{x^{2/3}} \right)$$

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(Note: This is #5 continued.) Find y' for the following functions. (Do NOT bother to simplify!!!)

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

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



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: \_\_\_\_\_