Math 229 Exam 1 01/31/2007

Name:_

Instructions: You will have 50 minutes to complete this exam. Calculators are allowed, but this is a closed book, closed notes exam. I will give credit to each problem proportional to the amount of correct work shown. Correct answers without supporting work will receive little credit. Be sure to simplify answers when possible. Also, make sure to follow directions carefully on each problem.

- 1. Given the points A : (-1, 4) and B : (5, -2):
 - (a) (3 points) Find the distance between A and B

(b) (3 points) Find the equation for the circle centered at A and passing through the point B.

(c) (3 points) Find the point C such that B is the midpoint of the line segment connecting A to C

(d) (3 points) Find an equation for the line containing A and B

(e) (3 points) Find an equation for the vertical line containing A

- 2. Given the equation 4x + 3y = -2
 - (a) (3 points) Find the slope of the line represented by this equation.

(b) (4 points) Find the x and y intercepts for this line.

(c) (3 points) Give an equation for the line that passes through the origin and is parallel to this line.

$$f(x) = \begin{cases} -x & \text{if } x < 1\\ 0 & \text{if } x = 1\\ 2x - 1 & \text{if } x > 1 \end{cases}$$

3. Given the function

(a) (8 points) Graph f(x).

(b) (6 points) Find the domain and range of f(x). Give your answer in interval notation.

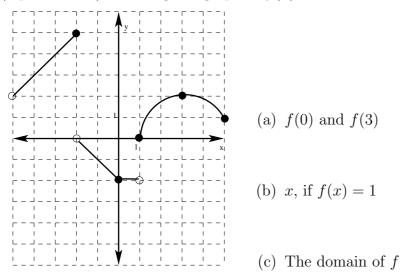
- 4. Suppose you own a company that manufactures widgets. Your supplier sells you the widgets wholesale at \$8 apiece. It costs you \$750 a month to rent your store, and you spend an additional \$2150 each month on utilities, supplies, and employee salaries. You sell the widgets at a retail price of \$15 apiece.
 - (a) (3 points) Find an equation C(x) that gives your monthly costs, where x is the number of widgets you purchase for sale that month.

(b) (5 points) Find equations for your monthly revenue, R(x), and your monthly profits, P(x), assuming that you sell all of the new widgets that you purchase.

(c) (4 points) How many widgets do you need to sell each month in order to break even?

5. (8 points) Suppose that the supply and demand for a product are given by the equations 2p+3x = 90 and 4p-2x = 100, where x is the quantity sold, in thousands, and p is the price in dollars. Find the equilibrium price for this product, and the quantity sold at this price.

6. (2 points each) For the given graph of f(x), find the following:



- (d) The range of f
- (e) The intervals where f is increasing.
- 7. (8 points) Find the values of x that satisfy the inequality $2x^2 + 3x 2 > 0$. Graph your solution on a number line.

- 8. Given that $f(x) = \sqrt{2x-2}$ and $g(x) = \frac{4}{3x-2}$
 - (a) (4 points) Find g(6) and f(3a+1)

(b) (3 points) Find
$$\frac{g}{f}(3)$$

- (c) (3 points) Find $f \circ g(2)$
- 9. Given that $f(x) = \sqrt{3x-2}$ and $g(x) = x^2 4$
 - (a) (4 points) Find $g \circ f(x)$

(b) (5 points) Find the domain of $\frac{f}{g}$? Give your answer in interval notation.

(c) (5 points) Find
$$\frac{g(a+h) - g(a)}{h}$$
. Simplify your answer.