Math 1730 **Test #1B** **Spring 2013**

Name: _____

Rocket Number: _____

Instructor: _____

Recitation Section (circle): 011 012 021 022 031 032 041 042 961

Photo ID Checked: _____
(Signature of Proctor or Instructor)

I verify that I am the above named student:_____
(Student signature)

Make sure you show **ALL YOUR WORK**. The answer alone will just receive partial credit (unless the question is a one-step question) – you need to demonstrate you know how to calculate the answer.

1. Find each of the given limits:

a. (4 points) $\lim_{x \to 4} \sqrt{2x - 5}$

b. (6 points) $\lim_{x \to 3} \frac{x^2 - 9}{x^2 - 4x + 3}$

2. A college club starts selling sweatshirts for $19 as a fundraiser. If each sweatshirt costs $12.50 to order and the club has fixed costs of $221 to design and order the sweatshirts, find each of the following:

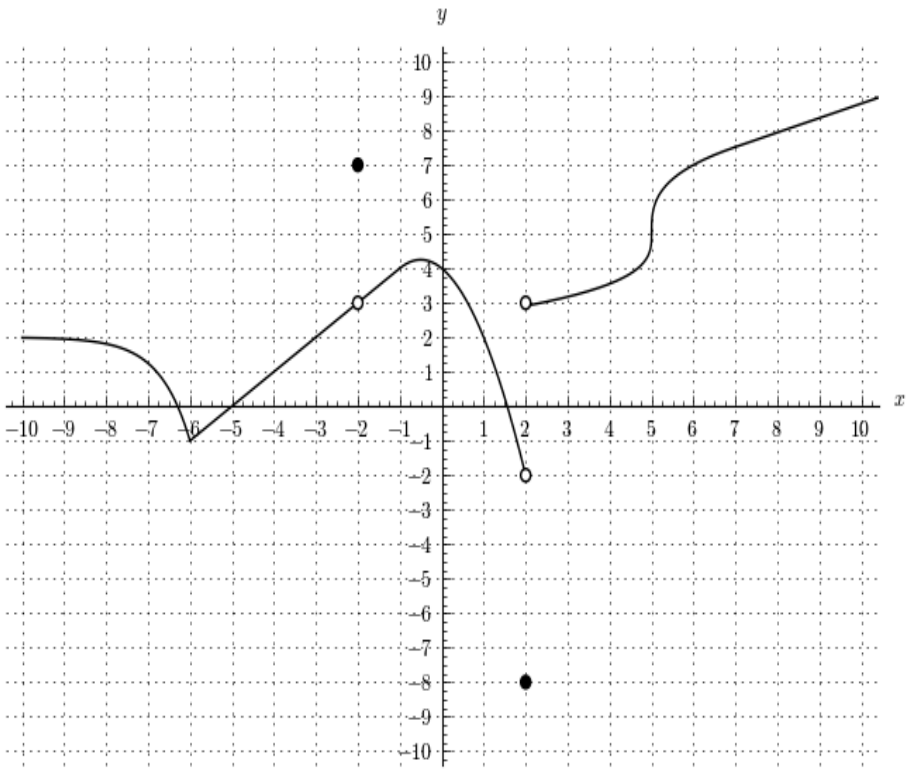
a. (2 points) The cost function

b. (2 points) The revenue function

c. (4 points) The profit function

d. (4 points) The break-even quantity

3. (18 points) Given the following graph, find each of the following:



a. For what value(s) of x is the function discontinuous? _____

b. For what value(s) of x is does the derivative not exist? _____

c. $\lim_{x \to -2^-} f(x) =$ _____

d. $\lim_{x \to -2^+} f(x) =$ _____

e. $\lim_{x \to -2} f(x) =$ _____

f. $f(-2) =$ _____

g. $\lim_{x \to 2^-} f(x) =$ _____

h. $\lim_{x \to 2+} f(x) =$ _____

i. $\lim_{x \to 2} f(x) =$ _____

j. $f(2) =$ _____

k. $\lim_{x \to 5^-} f(x) =$ _____

l. $\lim_{x \to 5^+} f(x) =$ _____

m. $\lim_{x \to 5} f(x) =$ _____

n. $f(5) =$ _____

4. (10 points) Find the equation of a tangent line to the graph of $f(x) = 4x^3 - 5x + 10$ at the point (-1, 11)

5. (10 points) For $f(x) = x^2 - 4x - 3$, calculate $f'(x)$ using the definition of the derivative,

$$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

6. (10 points) The dollar value of a piece of real estate grows to a value *V* given by $V = 300{,}000 + 1000t^2$ where *t* is in years.

   a. Find the value of the real estate after 12 years

   b. Find the rate of change of the value of the real estate, *dV/dt*

   c. Find the rate of change of the value of the real estate at $t = 12$

7. Calculate the values of each of the following derivatives:

a. (5 points) $f(x) = 5x^7 - 3x^5 + 4x^3 - 2x + 4$

b. (5 points) $f(x) = 4x^{-3} + 12x^{1/3}$

c. (5 points) $g(x) = \frac{7}{x^3} + 3\sqrt{x}$

d. (5 points) $f(x) = (4x^2 - 7x - 5)^6$

e. (5 points) Use the product rule: $f(x) = (x^2 - 3x)(5x^3 + 4)$

f. (5 points) $f(x) = \frac{x^2 + 4x}{5 - 6x^2}$