Name:

MATH 105 - SEC 001, FALL 2010. QUIZ 3
TIME LIMIT: 25 MINUTES

INSTRUCTOR: GERARDO HERNÁNDEZ

Problem 1

Consider the following piecewise defined function

$$
f(x) = \begin{cases} 2\,x - 4, & -4 < x \le 1 \\ x - 3, & 1 < x \le 3 \\ 1 - x, & 3 < x < 6 \end{cases}
$$

(a)(3 pts) Sketch the graph of this function

(b)(3 pts) Find the domain and range of this function

Date: September 28, 2010.

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Problem 2 (14 points)

In order to gain popularity among students, a brand new on-campus hair salon plans to offer a special promotion. The cost of a haircut, in dollars, at the salon as a function of time, in days since February 10th may be described as

$$C(t) = \begin{cases} 9, \ 0 \le t \le 3 \\ 9 + t, \ 3 < t \le 8 \\ 20, \ 8 < t < 28 \end{cases}$$

(Assue t takes whole numbers values.)

(a) (3 pts.) If you want them to give them a try, on what date(s) should you have a haircut in order to get the best price?

(b) (2 pts.) How much will a haircut cost on Feb. 18th?

(c) (2 pts.) On what date will a haircut cost 13 dollars?

(d) (3 pts.) The cost of a haircut at least A dollars B days into the promotion. Write an expression that describes this sentence using function notation and mathematics symbols only.

(e) (4 pts) Calculate $C(9) - C(8)$ and interpret its meaning in the context of the problem.

Problem 3

(3 pts).Sketch a graph which is everywhere positive, increasing, and concave up.

Problem 4.

(4 pts.) Let $P = f(t)$ be the population in millions in year t. Assume this function is invertible. Give the **meaning** and **units** of the inverse function.

Problem 5.

(4 Pts). Find the zeros of $Q(x) = -5x + 2x^2 - 3$ using the quadratic formula.

Problem 6

(4 Pts). Determine the concavity of the graph of $f(x) = 4 - x^2$ between $x = -1$ and $x = 5$ by calculating average rates of change over intervals of length 2.