Quiz III

Name:

Show all your work.!

(1) The density function for certain processes is given by
$$p(t) = 0.04 - 0.0008t \qquad \text{for} \qquad 0 \le t \le 50,$$
where t is given in minutes.

Use the Fundamental Theorem of Calculus to find:
(a) the mean time of the processes
(b) the median of the processes
(c) the proportion of the processes that take between 20 and 30 minutes.

(2) The following problem concerns the cost, C, of renting a car from a company which charges $40 a day and 15 cents a mile, so

$$C = f(d, m) = 40d + 0.15m,$$

where d is the number of days, and m is the number of miles.

(a) Make a table of values for C, using $d = 1, 2, 3, 4$ and $m = 100, 200, 300, 400$

(b) Find $f(4, 300)$ and interpret it.

(c) Explain the significance of $f(4, m)$ in terms of rental car costs. Graph this function, with C as a function of m.

(d) Explain the significance of $f(d, 300)$ in terms of rental car costs. Graph this function, with C as a function of d.

(3) Sketch a contour diagram for the function given below, with at least four labeled contours. Describe the contours and how they are spaced

$$f(x, y) = x + y + 1$$

(4) The demand for coffee, Q, in pounds sold per week, is a function of the price of coffee, c, in dollars per pound and the price of tea, t, in dollars per pound, so $Q = f(c, t)$

(a) Do you expect f_c to be positive or negative? What about f_t? Explain.

(b) Interpret each of the following statements in terms of the demand for coffee:

$$f(3, 2) = 780 \qquad f_c(3, 2) = -60 \qquad f_t(3, 2) = 20$$