Math 122 (Section 5) **Quiz 9** **April 15, 2002**

Name _____

You must show all of your work to receive credit for a correct answer. You are not allowed to borrow another student's calculator during the quiz.

1. (6 points) A small city had a population of 5000 people in the year 1960. Since 1960, its population has been increasing by $f(t) = \dfrac{500t + 800}{t^2 + 3t + 2}$ people per year, where t represents the number of years since 1960. Assuming that the population continues to grow at this rate, answer the following questions.

   (a) Using correct mathematical notation, write down the definite integral which will represent the total change in population of this city between 1960 and 2010.

   (b) Evaluate the definite integral which you found for part (a) and round off your answer to the nearest integer.

   (c) What do you expect the population of this city to be in 2010?

2. (2 points) Which one of the following most clearly states the Fundamental Theorem of Calculus?

(a) Rate of change of a quantity from $t = a$ to $t = b$ equals $\int_a^b$ (total change in that quantity) dt

(b) Rate of change of a quantity from $t = a$ to $t = b$ equals $\int_b^a$ (total change in that quantity) dt

(c) Total change in a quantity from $t = a$ to $t = b$ equals $\int_a^b$ (rate of change of that quantity) dt

(d) Total change in a quantity from $t = a$ to $t = b$ equals $\int_b^a$ (rate of change of that quantity) dt

(e) Rate of change of a quantity from $t = a$ to $t = b$ equals $\int_a^b$ (rate of change of that quantity) dt

(f) Rate of change of a quantity from $t = a$ to $t = b$ equals $\int_b^a$ (rate of change of that quantity) dt

(g) Total change in a quantity from $t = a$ to $t = b$ equals $\int_a^b$ (total change in that quantity) dt

(h) Total change in a quantity from $t = a$ to $t = b$ equals $\int_b^a$ (total change in that quantity) dt

3. (2 points) Which one of the following most clearly states the Fundamental Theorem of Calculus?

(a) $\int_a^b F'(t)\ dt = F'(b) - F'(a)$

(b) $\int_a^b F'(t)\ dt = F'(a) - F'(b)$

(c) $\int_a^b F'(t)\ dt = F(b) - F(a)$

(d) $\int_a^b F'(t)\ dt = F(a) - F(b)$

(e) $\int_a^b F(t)\ dt = F'(b) - F'(a)$

(f) $\int_a^b F(t)\ dt = F'(a) - F'(b)$

(g) $\int_a^b F(t)\ dt = F(b) - F(a)$

(h) $\int_a^b F(t)\ dt = F(a) - F(b)$