Math 167 Ch 6-7 Sample Test Name _____

I. Consider: $\int_0^4 \left(x^2 + 2x + 1\right) dx$ *(5 pts ea)*

1. Find an approximation using four right-hand rectangles ($n = 4$). Make a sketch of the function and rectangles.

2. Find an approximation using the *fnint* feature of your calculator. (Write down what you entered.)

3. Find the exact answer using the (FTIC) Fundamental Theorem of Integral Calculus.

II. Integrate the following: *(8 pts ea)*

4. $\int \left(6\sqrt{x} - \frac{1}{x^3} + 2\right) dx$

5. $\int \left(5e^x + \frac{3}{x} - x\right) dx$

6. $\int \left(\frac{x}{3x^2 - 1}\right) dx$

7. $\int x(x-5)^6 \, dx$

8. $\int x^2 (\ln x) \, dx$

9. Use Table of Integrals #5. $\int \frac{u}{\sqrt{a+bu}} \, du = \frac{2}{3b^2}(bu - 2a)\sqrt{a+bu} + C$ to find: $\int \frac{e^{2x}}{\sqrt{4+5e^x}} \, dx$

V, Average Value:

The price (P) of STAZCO Stock fluctuated continuously over an 8 hour period (time $t = 0$ to 8) according to the relation: $P = -0.24t^3 + 2.1t^2 + 12$

a) What was the starting and ending price for the stock? *(6 pts)*

b) What was the average price of the stock over that time period? *(10 pts)*

IV. Consumers' and Producers' Surplus:

The quantity demanded x (in units of a hundred) of a jacket per week is related to the unit price p (in dollars) by the equation: $p = -0.1x^2 - x + 40$

The quantity x (in units of a hundred) that the supplier is willing to make available in the market per week is related to the unit price: $p = 0.1x^2 + 2x + 20$

a) Find the equilibrium price. *(5 pts)*

b) If the market price is set at the equilibrium price, find the consumers' and producers' surplus. *(10 pts)*

c) Make a sketch of the situation and discuss which group is "benefiting most" by setting the market price at equilibrium. *(6 pts)*