

Take-Home Portion of the Final Exam

Due Date: August 12th, 2010 at the beginning of the final exam

Write solutions to these problems on a separate sheet of paper and staple this sheet (with your signature on the back) to the top of your solutions.

- (6 pts.) Find the global maximum and the global minimum **values** of the function $f(x) = \frac{2}{3}x^3 - 6.5x^2 + 15x - 20$ on the interval $0 \leq x \leq 4$.
- (6 pts.) Find the consumer surplus given the demand curve $p = 400 - e^{0.02q}$ if 200 units are sold at the current market price.
- (6 pts.) For the function $z = f(x, y) = 2x^2e^y + \ln y + 5x$, find $\frac{\partial z}{\partial x}\bigg|_{(3,1)}$ and $\frac{\partial z}{\partial y}\bigg|_{(3,1)}$.
- (6 pts.) Suppose the production of avocados (in thousands of tons) during a given year in California is given by the function $A = f(T, R)$, where T is the average daily temperature in degrees Fahrenheit and R is the yearly rainfall in inches. The table below gives values of the function for particular values of T and R .

Average Daily Temperature T

	60	65	70
40	10.1	13.3	15.2
50	12.5	18.8	19.5
60	16.8	20.4	21

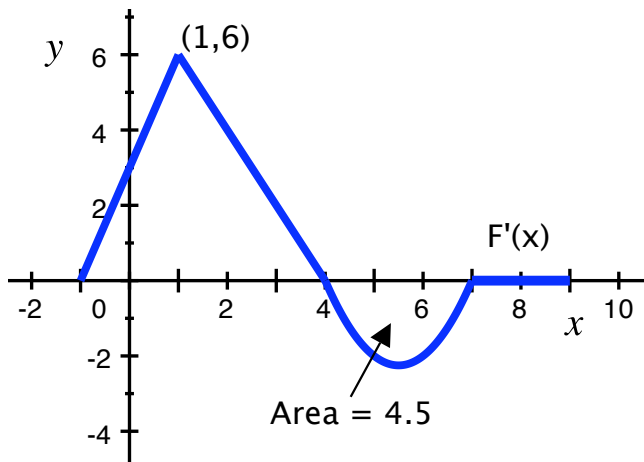
- (2 pts.) Find $f(65, 50)$ and interpret it in terms of avocado production. Include units in your answer.
- (2 pts.) Estimate $f_T(65, 50)$ and $f_R(65, 50)$ and interpret both in terms of avocado production. Include units in your answers.
- (2 pts.) Estimate $f(67, 53)$ using the information from parts (a) and (b). Include units in your answer.

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5. (6 pts.) The following is a graph of the **derivative** function $F'(x)$.

Given that $F(4) = 7$, find exact values of $F(-1)$, $F(1)$, $F(7)$, and $F(9)$.

Then sketch a rough graph of $F(x)$. (Be sure to correctly show where $F(x)$ is increasing and decreasing.)



I completed this cumulative exam without the use of outside help except from the class notes, textbook, and advice from the instructor. I understand that any evidence of cheating will result in a grade of zero on the take-home portion of the final exam.

Signature

Date

Yearly Rainfall R