

Do not write your name on the assignment. Write your name only on the back of this sheet of paper and staple your answers on the front of this sheet of paper. Your assignment will be typed, except graphs can be drawn by hand and mathematical equations can be done by hand. Failure to follow these directions will cost you 1 point on the assignment and failure to type it will cost you 10 points.

For all questions, show all work.

1) (25 points) Minimize $C = K^2 + 3L^2$ subject to $K + 6L = 91$. Find the equilibrium values of K , L , and λ . Approximately, how much would C increase if the 91 became 93?

2) (25 points) Maximize $U = 9F^{1/3}J^{2/3}$ subject to $3F + J = 90$. Find the equilibrium values of F , J , and λ . Approximately, how much would utility increase if the income of 90 became 91?

3) (25 points) Maximize $U = R^2V^2$ subject to a budget constraint of an income of \$20 with a price of records is $\$6/R$ and of violets is $\$1/V$. Find the equilibrium values of R , V , and λ . Approximately, how much would utility increase if the 20 became 23?

4) (25 points) Maximize $C = K + 6L$ subject to $K^2 + 3L^2 = 637$. Find the equilibrium values of K , L , and λ . How does your answer compare to your answer in #1? Why?