

The Last One1

Place your name on the back of this sheet of paper and nowhere else. Staple your answers on the front of this sheet of paper. Failure to follow these directions will cost you 10 points. If you use double-sided printing or write on the back of scrap paper, I will give you one additional point.

Show all work for all questions.

1) (30 points) Take the following system of equations and write it in the $\mathbf{Ax}=\mathbf{b}$ format. Find \mathbf{A}^{-1} and use that to solve the system. Assume that the real money supply, M/P , = 90.

$$r = Y/100 - .1(M/P)$$

$$Y = 1021 - 200r + .1(M/P) + X$$

$$X = 92 - .1Y + r.$$

2) (30 points) Suppose \$1 worth of energy uses \$.10 worth of energy and \$.20 worth of food to feed the employees. \$1 worth of food uses \$.25 units of energy and \$.15 worth of food. Set up the Leontief Input-Output Matrix. Use the $(\mathbf{I}-\mathbf{A})^{-1}$ method of using the matrix to find out how much of energy and food we need to produce if we want to sell \$1410 worth of food and \$710 worth of energy.

3) (30 points) Use Cramer's rule to solve the following system of equations.

$$X - Y = 0 \quad 2X + 3Z = 50 \quad Y - 2Z = -10$$

Hint: For each determinant, determine which row or column you are going to expand by and only find the minors and cofactors for that row or column. That means you only find 3 cofactors per determinant rather than 9.

4) (10 points) Suppose $Q = A(K^{1/2})(L^{1/3})(T^{1/6})$ where A is technology, K is capital, L is labor, and T is land. (T representing land is standard notation.) Find the MPK, MPL, and MPT.