**Test #1**

Points for each problem are shown out of 100 points.  Each subsection in a problem is weighted equally.

Please show the calculations used to arrive at your answers.  Draw graphs neatly and label clearly.
Round answers to the first decimal place if necessary.

A. (20 pts) Answer True, False, or Uncertain, and briefly explain your answer.

   (1) Total cost minus total revenue can never be a positive number for a firm that is still
       operating (i.e., producing output).

   (2) A tax on soft drinks will raise their price and increase the quantity of soft drinks
       produced.

   (3) Suppose that demand is perfectly elastic.  If the demand curve shifts downward, then price
       will decrease and quantity will decrease.

   (4) Production possibility frontiers always slope upward and must be straight lines.


B. (20 pts) Short answers.

   (1) If guns and knives are substitutes, what happens in the market for knives if guns are banned?

   (2) What is the numerical value for income elasticity if the demand function is $Q = \dfrac{24}{P}$
       (where I =income, P = price, and Q = quantity demanded)?

   (3) Explain why there is no deadweight loss if supply is perfectly inelastic.

   (4) What should Rosy do if she finds that currently she has $\dfrac{MU_A}{P_A} < \dfrac{MU_B}{P_B}$ ,
       where A = apples and B = bananas?

C. (10 pts) Evan has the utility function $U = 2\ln B + 3\ln F$
where B = basketballs and F = frisbees.

  (1) If Evan has 3 basketballs and 3 frisbees, what is his marginal utility with respect to frisbees?

  (2) What must the price ratio of basketballs to frisbees be if Evan is consuming optimally?

D. (20 pts) Cannon Industries produces cannons using the following production function:

  $Q = \min[20K, 50L]$

  Q = units of output, K = units of capital, and L = units of labor
  Capital costs 5 a unit and labor costs 5 a unit.

  (1) Graph the isoquant for Cannon corresponding to Q = 100.

  (2) In order to produce Q = 100, how much capital and labor should Cannon buy?

  (3) Add to your graph from (1) the isocost curve that Cannon will be on, and mark the point on your graph corresponding to Cannon's cost-minimizing choices of capital and labor.

  (4) If the prices change to $P_K = 2$ and $P_L = 10$, now how much capital and labor will Cannon buy in order to stay on the same isoquant?

E. (30 pts) A market is characterized by $Q_D = 3000 - 60P$ and $Q_S = 40P - 1000$

  (1) What are the equilibrium price and quantity?

  (2) If a quota is placed on the market of 800, what are price and quantity?

  (3) If the quota is reduced to 300, what are price and quantity?

  (4) How much deadweight loss is caused by the quota of 300? How much surplus is transferred from consumers to producers?

  (5) Draw a graph showing the market before and after the quota of 300 and mark both the deadweight loss and the transfer of surplus from consumers to producers caused by the quota.

  (6) If the government wanted to use a tax instead of a quota to reduce the quantity traded in this market down to 300, what would the tax per unit sold need to be?