Midterm 2

You have until 11:50am to complete this exam. Be certain to put your name, id number and section on both the exam and your scantron sheet and fill in test form A on the scantron. Answer all multiple choice questions on your scantron sheet. Choose the single best answer for each question; if you fill in multiple answers for a question you will be marked wrong. Answer the short answer questions directly on the exam. You must show your work for full credit. Answers may be left as fractions. Please place a box around final answers when appropriate. Good luck!

Name: **ID Number:**   **Section:**

SECTION I: MULTIPLE CHOICE (60 points)

1. Suppose that x and y are the only two goods Abel consumes and he always consumes positive quantities of both goods. If the price of x changes and the substitution effect for y is positive, we can say for certain that:

   (a) The price of x must have gone up.
   (b) The price of x must have gone down.
   (c) The answer depends on whether x is a Giffen good.
   (d) The answer depends on whether y is a Giffen good.

2. There are four consumers in the market for soda. For each individual consumer, if the price of soda falls by \$1, his individual consumption of soda increases by 2 units. The slope of an individual consumer's demand curve will be _____ and the slope of the market demand curve will be _____.

   (a) $-\frac{1}{2}$, $-\frac{1}{8}$.
   (b) $-\frac{1}{2}$, -2.
   (c) -2, $-\frac{1}{2}$.
   (d) -2, -8.

3. A firm only uses capital and labor in production. Suppose that the firm improves its technology such that any particular combination of capital and labor produces twice as much output as it did before. Which of the following statements is not true?

   (a) The marginal product of labor will be twice as large as before.
   (b) The marginal product of capital will be twice as large as before.
   (c) The technical rate of substitution will be twice as large before (assume we are looking a graph with labor on the horizontal axis and capital on the vertical).
   (d) All of the above are true.

4. Which of the following is the best ordering of goods from most elastic to most inelastic in terms of the price elasticity of demand?

   (a) Ham sandwiches, sandwiches of any kind, food of any kind.
   (b) Ham sandwiches, food of any kind, sandwiches of any kind.
   (c) Food of any kind, sandwiches of any kind, ham sandwiches.
   (d) Food of any kind, ham sandwiches, sandwiches of any kind.

5. Suppose that for the same demand and supply curves, a quantity tax of $2 per unit and a value tax of 15% would generate the same tax revenue. Which of the following is true?

   (a) The quantity tax would create a larger deadweight loss than the value tax.
   (b) The value tax would create a larger deadweight loss than the quantity tax.
   (c) The quantity tax and the value tax would generate the same deadweight loss.
   (d) Not enough information.

6. Suppose that capital and labor are the only two inputs a firm uses, the marginal product of capital and the marginal product of labor are both constant, and the firm's technology is monotonic. We can say for certain that:

   (a) A graph of output as a function of labor holding capital fixed will be a straight line.
   (b) A graph of output as a function of capital holding labor fixed will be a straight line.
   (c) The isoquants will be straight lines.
   (d) All of the above.

7. Demand for medicine is perfectly inelastic. The supply of medicine is an upward sloping line. If a $5 quantity tax is placed on the producers of medicine:

   (a) The price consumers pay for medicine will stay the same.
   (b) The price consumers pay for medicine will increase but by less than $5.
   (c) The price consumers pay for medicine will increase by $5.
   (d) The price consumers pay for medicine will decrease by $5.

8. Suppose the price of a Giffen good changes. The income and subsitution effects for the good will:

   (a) Have the same sign if the price went up.
   (b) Have the same sign if the price went down.
   (c) Both (a) and (b) are true.
   (d) Neither (a) nor (b) are true.

9. The demand function for candy bars is given by $C = \frac{I}{p_c}$ where C is the number of candy bars, I is income and p_C is the price of a candy bar. The income elasticity for candy bars will:

   (a) Increase if income increases.
   (b) Decrease if income increases.
   (c) Stay the same when income increases.
   (d) Not enough information.

10. Consumers for DVDs have a downward sloping demand curve and are currently buying 100 DVDs. If the price of a DVD drops by \$1, consumer surplus will:

    (a) Go up by less than 100.
    (b) Go up by 100.
    (c) Go up by more than 100.
    (d) Go down.

11. The clothing store estimates that the price elasticity of demand for hats is -0.40. If the clothing store decreases the price of hats by a small amount:

    (a) The store will sell fewer hats and earn less revenue.
    (b) The store will sell fewer hats and earn more revenue.
    (c) The store will sell more hats and earn less revenue.
    (d) The store will sell more hats and earn more revenue.
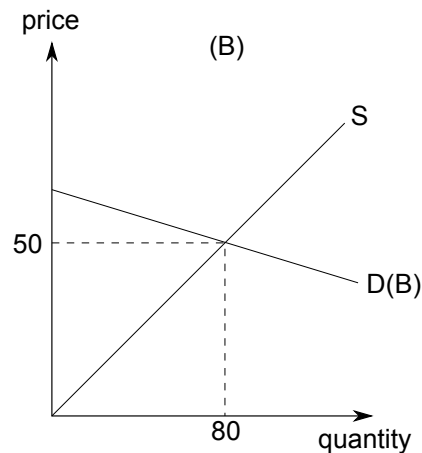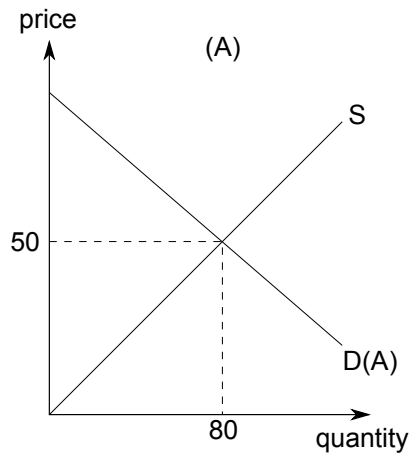
Use the figures above to answer questions 12 and 13. The supply curves are identical for Figure A and Figure B. The only difference between the figures is the slope of the demand curve. Demand curve A is steeper than demand curve B.

12. Suppose that a \$5 quantity tax is placed on consumers. When comparing the equilibrium after the tax to the equilibrium before the tax, which of the following is true?

    (a) The price paid by consumers will increase and the increase will be larger for market A than market B.
    (b) The price paid by consumers will increase and the increase will be larger for market B than market A.
    (c) The price paid by consumers will increase by the same amount for market A and market B.
    (d) The price paid by consumers will not change.

13. When the $5 quantity tax is placed on consumers, producer surplus will:

    (a) Decrease, with the decrease being larger in market A than in market B.
    (b) Decrease, with the decrease being larger in market B than in market A.
    (c) Increase, with the increase being larger in market A than in market B.
    (d) Increase, with the increase being larger in market B than in market A.

14. A firm uses an increasing returns to scale technology and decides to double output by scaling up all of its inputs by the same amount. This will require:

    (a) Doubling the number of inputs used.
    (b) Increasing the number of inputs used but by less than double.
    (c) Increasing the number of inputs used by more than double.
    (d) Not enough information.

15. Every extra worker a firm uses increases output by five units no matter how many workers the firm is already using. On a graph with output on the vertical axis and workers on the horizontal axis, output as a function of the number of workers will be:

    (a) A straight line with a positive slope.
    (b) An upward sloping curve that gets flatter as the number of workers increases.
    (c) A horizontal line.
    (d) An upward sloping curve that gets steeper as the number of workers increases.

SECTION II: SHORT ANSWER (40 points)

1. (15 points) The two graphs below give the demand curves for two different consumers, Adam and Bob. Both demand curves are straight lines. The horizontal and vertical intercepts are labeled on the graphs.

(a) Draw a graph of the market demand curve, assuming that Adam and Bob are the only two consumers in the market. Be certain to label all intercepts, kinks and slopes with their numerical values.

(b) Write down an expression for market demand as a function of price (note that your market demand equation may be different for different price ranges).

(c) Suppose that the supply function for this market is given by:

$$S(p) = 10p \tag{1}$$

Solve for the equilibrium market price, the number of units Adam buys at the equilirium price and the number of units Bob buys at the equilibrium price.

2. (15 points) A firm uses metal and wood to produce chairs. They can make chairs entirely out of metal, entirely out of wood, or out of a combination of metal or wood. They can always replace two units of wood with one unit of metal or one unit of metal with two units of wood without affecting the level of output. If they use only metal, it takes four units of metal to produce a single chair.

   (a) Write down the production function for the firm, $f(M, W)$, where M is the number of units of metal used and W is the number of units of wood used. The production function should give the total number of chairs produced.

   (b) On a graph with wood on the horizontal axis and metal on the vertical axis, draw the isoquant for an output level of 20 chairs. Label any intercepts or slopes with their numerical values where possible.

   (c) Using your production function from part (a), show whether the firm exhibits decreasing returns to scale, constant returns to scale or increasing returns to scale.

3. (10 points) The graph below shows the demand and supply curves in the market for food. Suppose that the city of Davis decides to place a 10% value tax on food. The tax will be placed on consumers. On the graph, show the effects of this tax on consumer surplus and producer surplus. Be certain to carefully label your graph (note that for many items of the graph you will not be able to give numerical values, you should still label these items in a way that makes it clear what they are).