Name ______________________

Eco200: Practice Test 3B
Covering Chapters 16, 18-21

1. Use the data below to answer the following questions:

<table>
<thead>
<tr>
<th>Firm 1 Decision</th>
<th>Sell 15</th>
<th>Sell 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm 1: Profit $90</td>
<td>Firm 1: Profit $100</td>
<td></td>
</tr>
<tr>
<td>Firm 2: Profit $90</td>
<td>Firm 2: Profit $75</td>
<td></td>
</tr>
<tr>
<td>Sell 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm 1: Profit $75</td>
<td>Firm 1: Profit $80</td>
<td></td>
</tr>
<tr>
<td>Firm 2: Profit $100</td>
<td>Firm 2: Profit $80</td>
<td></td>
</tr>
</tbody>
</table>

a. Is there a dominant strategy for either firm? What is the Nash equilibrium? Explain…

b. If the two firms could collude and agree on how to split the total profits, what outcome would they pick?

c. Explain what type of measures do governments try to prevent cooperation between oligopolists?

Solution:

a. Firm 1 has a dominant strategy of selling 20 and firm 2 has a dominant strategy of selling 20. Why and how? By definition, a dominant strategy is a strategy that is the best for a player in a game regardless of the strategy chosen by the other players. For the moment, let’s focus on Firm 1. Say, Firm 2 decides to sell 15. As Firm 1, you have a choice between selling 15 for a profit of $90 and selling 20 for a profit of $100. If you have a choice you would elect for more profit and choose to sell 20 for a profit of $100. What if Firm 2 chooses to sell 20 instead? Now, as Firm 1 you once again have a choice between selling 15 or selling 20, but it depends on the amount of profit. If Firm 2 chooses to sell 20, as Firm 1, you have a choice of selling 15 for a profit of $75 or selling 20 for a profit of $80. Of course, Firm 1 would elect for more profit and choose to sell 20. As a result, it doesn’t matter what Firm 2 decides because Firm 1 will always choose to sell 20 because their strategy dominates their other choices. The same logic can be applied to Firm 2.

In terms of the Nash equilibrium, Firm 1 will choose their dominant strategy of selling 20 and Firm 2 will choose their dominant strategy of selling 20. With this information, the Nash equilibrium will be to Firm 1: Sell 20 & Firm 2: Sell 20.

b. If the two firms could collude, they would select the highest amount of the profit and split the profit. However, there must be a binding agreement in order for this to occur.

c. For many countries, antitrust laws make it illegal for firms to make agreements not to compete.
2. This problem is from the text: Chapter 18, Problems and Applications, Q2
Show the effect of each of the following events on the market for labor in the computer manufacturing industry.
   a. Congress buys personal computers for all U.S. college students.
   b. More college students major in engineering and computer science.
   c. Computer firms build new manufacturing plants.

Solution:
   a. If Congress were to buy personal computers for all U.S. college students, the demand for computers would increase, raising the price of computers and thus increasing the value of marginal product of workers who produce computers. This is shown in Figure 4 as a shift in the demand curve for labor from D1 to D2. The result is an increase in the wage from w1 to w2 and an increase in the quantity of labor from L1 to L2.

![Figure 4]

   b. If more college students major in engineering and computer science, the supply of labor in the computer industry rises. This is shown in figure below as a shift in the supply curve from S1 to S2. The result is a decrease in the wage from w1 to w2 and an increase in the quantity of labor from L1 to L2.

![Figure 4]

   c. If computer firms build new manufacturing plants, this increases the marginal product of labor and the value of the marginal product of labor for any given quantity of labor. This is shown in figure on the next page as a shift in the demand curve for labor from D1 to D2. The result is an increase in the wage from w1 to w2 and an increase in the quantity of labor from L1 to L2.
3. This is a series of topics throughout Chapter 19.
   a. Why does someone who has a great amount of human capital that was acquired through education earn more than someone with a small amount of human capital?
   b. What has happened to the relative wages of skilled and unskilled workers in the United States over the last 20 years? Why?
   c. Explain the theory that education acts as a signaling device. How does this contrast with the theory of education as an investment in human capital?

Solutions:
   a. Because workers with greater human capital are more productive and firms are willing to pay more for workers with a greater value of marginal product. In addition, workers must be compensated for the cost of educating themselves.
   b. The gap between skilled and unskilled wages has risen, possibly because the growth in international trade has allowed the US to import goods made by unskilled workers in countries where unskilled labor is plentiful and export goods made by skilled workers. This would increase the relative demand for skilled workers. Or it could be that increases in technology have increased the relative demand for skilled workers.
   c. The theory of signaling suggests that those who have desirable "productivity" characteristics are more likely to finish educational programs. The human capital theory suggests that productivity characteristics are enhanced by the learning that takes place in formal educational programs.
4. This is a series of topics throughout Chapter 20.
   a. Does poverty affect all groups within the population the same? Explain...
   b. If the poverty rate is 12 percent, does it mean that about 12 percent of the population live their entire lives in poverty? Explain...
   c. How could welfare programs exacerbate the problems they are supposed to cure?

Solution:
   a. No. With regard to race, blacks and Hispanics are more likely to live in poverty. With regard to age, young are more likely than average and old are less likely than average to live in poverty.

   With regard to family composition, families headed by females are more likely to live in poverty.
   b. No. There is a great deal of variation in a person’s income from year to year and a great deal of variation in a person’s income over their life cycle. There is also variation from generation to generation within a family. As a result, a much larger portion of the population than 12 percent lives some small portion of their lives in poverty, and very few live a large portion of their lives in poverty.
   c. Welfare programs could cause families to break up and unwed mothers to have children. They can cause disincentives to work. Children fail to see the advantages of work, and multiple generations become dependent on government.
5. Use Exhibit 2 to answer the following questions.
   a. Suppose the price of a magazine is $2, the price of a book is $10, and the consumer's income is $100. Which point on the graph represents the consumer's optimum - x, y, or z? What are the optimal quantities of books and magazines this individual chooses to consume?
   b. Suppose the price of books falls to $5. What are the two optimum points on the graph that represent the substitution effect (in sequence)? What is the change in the consumption of books due to the substitution effect?
   c. Again, suppose the price of books falls to $5. What are the two optimum points on the graph that represent the income effect (in sequence)? What is the change in the consumption of books due to the income effect? Is a book a normal good or an inferior good for this consumer? Explain.
   d. For this consumer, what is the total change in the quantity of books purchased when the price of books fell from $10 to $5?

Solution:
   a. Point z. 25 books and 5 magazines.
   b. From point z to point x. From five books to 8 books.
   c. From point x to point y. From eight books to 6 books. Books are inferior because an increase in income decreases the quantity demanded of books.
   d. The quantity demanded increased from 5 books to 6 books.