

MICROECONOMICS: HOMEWORK PROBLEMS – ANSWER KEY

Chapter 7: Pages155-157.

1. a. Consumer surplus is equal to willingness to pay minus the price paid. Therefore, Melissa’s willingness to pay must be \$200 (\$120 + \$80).
b. Her consumer surplus at a price of \$90 would be $200 - 90 = 110$.
c. If the price of an iPod was \$250, Melissa would not have purchased one because the price is greater than her willingness to pay. Therefore, she would receive no consumer surplus.
2. If an early freeze in California sours the lemon crop, the supply curve for lemons shifts to the left, as shown in Figure 5. The result is a rise in the price of lemons and a decline in consumer surplus from $A + B + C$ to just A . So consumer surplus declines by the amount $B + C$.

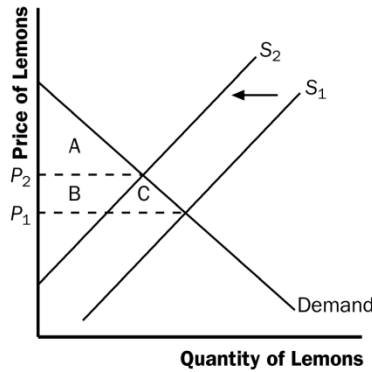


Figure 5

In the market for lemonade, the higher cost of lemons reduces the supply of lemonade, as shown in Figure 6. The result is a rise in the price of lemonade and a decline in consumer surplus from $D + E + F$ to just D , a loss of $E + F$. Note that an event that affects consumer surplus in one market often has effects on consumer surplus in other markets.

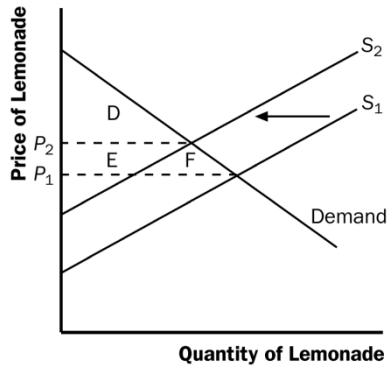


Figure 6

7. a. The effect of falling production costs in the market for stereos results in a shift to the right in the supply curve, as shown in Figure 11. As a result, the equilibrium price of stereos declines and the equilibrium quantity increases.

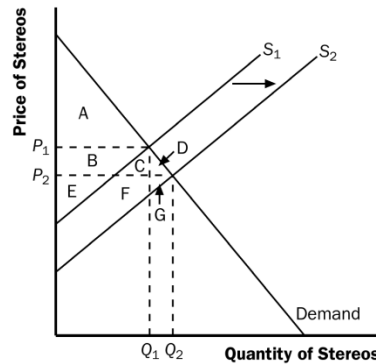


Figure 11

- b. The decline in the price of stereos increases consumer surplus from area A to A + B + C + D, an increase in the amount B + C + D. Prior to the shift in supply, producer surplus was areas B + E (the area above the supply curve and below the price). After the shift in supply, producer surplus is areas E + F + G. So producer surplus changes by the amount F + G - B, which may be positive or negative. The increase in quantity increases producer surplus, while the decline in the price reduces producer surplus. Because consumer surplus rises by B + C + D and producer surplus rises by F + G - B, total surplus rises by C + D + F + G.
- c. If the supply of stereos is very elastic, then the shift of the supply curve benefits consumers most. To take the most dramatic case, suppose the supply curve were horizontal, as shown in Figure 12. Then there is no producer surplus at all. Consumers capture all the benefits of falling production costs, with consumer surplus rising from area A to area A + B.
11. a. The supply and demand curves are shown in Figure 18. The equilibrium price and quantity are found by equating quantity demanded and quantity supplied:
 $Q^D = Q^S$
 $4P - 80 = 100 - 2P$
 $6P = 180$
 $P = \$3.00$
 Sub P* in equation Q^D AND Q^S
 $Q = 40$

The equilibrium price is \$3 per bushel and the equilibrium quantity is 40 bushels.

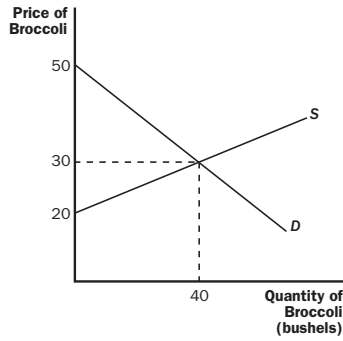


Figure 18

- b. At the market equilibrium, consumer surplus is equal to $(0.5)(\$20)(40) = \400 . Producer surplus at market equilibrium is $(0.5)(\$10)(40) = \200 . Therefore, total surplus is $\$400 + \$200 = \$600$.
- c. If a dictator banned the sale of broccoli, producer and consumer surplus would both fall to \$0. Buyers would be harmed more than sellers would because the decline in consumer surplus would be greater than the decline in producer surplus.

Chapter 21: Pages: 480.

2. Figure 5 shows a consumer's indifference curves for wine and cheese. Four properties of these indifference curves are: (1) higher indifference curves are preferred to lower ones because more is preferred to less; (2) indifference curves are downward sloping because if the quantity of wine is reduced, the quantity of cheese must increase for the consumer to be equally happy; (3) indifference curves do not cross because a consumer prefers more to less; and (4) indifference curves are bowed inward because a consumer is more willing to trade away wine if she has a lot of it and less willing to trade away cheese if she has little of it.

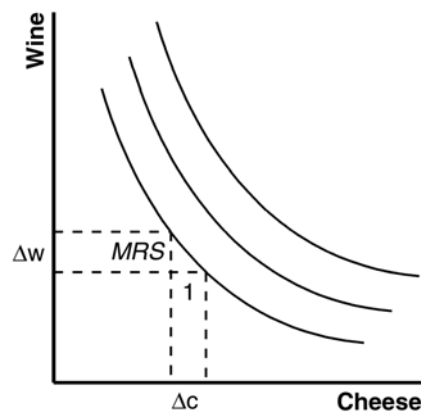


Figure 5

4. Figure 6 shows the consumer's budget constraint and indifference curves for wine and cheese. The consumer's optimum consumption choice is shown as w^* and c^* .

Because the marginal rate of substitution equals the relative price of the two goods at the optimum, the marginal rate of substitution is $\$6/\$3 = 2$.

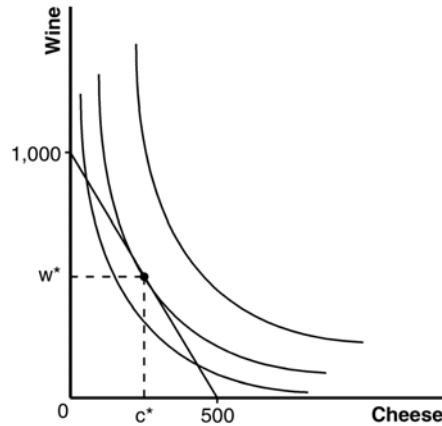


Figure 6

Chapter 13:
Pages: 284.

3. Marginal product is the increase in output that arises from an additional unit of input. Diminishing marginal product means that the marginal product of an input declines as the quantity of the input increases.

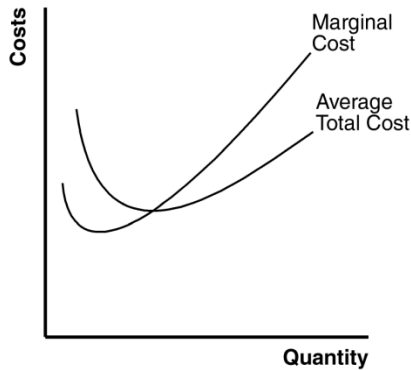


Figure 6

6. Figure 6 shows the marginal-cost curve and the average-total-cost curve for a typical firm. It has three main features: (1) marginal cost is rising; (2) average total cost is U-shaped; and (3) whenever marginal cost is less than average total cost, average total cost is declining; whenever marginal cost is greater than average total cost, average total cost is rising. Marginal cost is rising for output greater than a certain quantity because of diminishing returns. The average-total-cost curve is U-shaped because the firm initially is able to spread out fixed costs over additional units, but as quantity increases, it costs more to increase quantity further because an important input is limited. Whenever marginal cost is less than

average total cost, average total cost is declining; whenever marginal cost is greater than average total cost, average total cost is rising. The marginal cost and average total cost curves intersect at the minimum of average total cost; that quantity is the efficient scale.

8. Economies of scale exist when long-run average total cost falls as the quantity of output increases, which occurs because of specialization among workers. Diseconomies of scale exist when long-run average total cost rises as the quantity of output increases, which occurs because of coordination problems inherent in a large organization.

Chapter 13: Problems:Pages: 286-7.

8. The following table illustrates average fixed cost (*AFC*), average variable cost (*AVC*), and average total cost (*ATC*) for each quantity. The efficient scale is four houses per month, because that minimizes average total cost.

Quantity	Variable Cost	Fixed Cost	Total Cost	Average Fixed Cost	Average Variable Cost	Average Total Cost
0	\$0	\$200	\$200	---	---	---
1	10	200	210	\$200	\$10	\$210
2	20	200	220	100	10	110
3	40	200	240	66.7	13.3	80
4	80	200	280	50	20	70
5	160	200	360	40	32	72
6	320	200	520	33.3	53.3	86.7
7	640	200	840	28.6	91.4	120

10. a. The following table shows average variable cost (*AVC*), average total cost (*ATC*), and marginal cost (*MC*) for each quantity.

Quantity	Variable Cost	Total Cost	Average Variable Cost	Average Total Cost	Marginal Cost
0	\$0	\$30	---	---	---
1	10	40	\$10	\$40	\$10
2	25	55	12.5	27.5	15
3	45	75	15	25	20
4	70	100	17.5	25	25
5	100	130	20	26	30
6	135	165	22.5	27.5	35

- b. Figure 10 shows the three curves. The marginal-cost curve is below the average-total-cost curve when output is less than four and average total

cost is declining. The marginal-cost curve is above the average-total-cost curve when output is above four and average total cost is rising. The marginal-cost curve lies above the average-variable-cost curve.

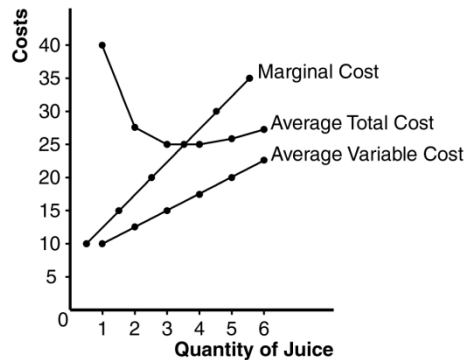


Figure 10

Chapter 14: Pages: 307

1. A competitive firm is a firm in a market in which: (1) there are many buyers and many sellers in the market; (2) the goods offered by the various sellers are largely the same; and (3) usually firms can freely enter or exit the market.

6. A firm's price equals marginal cost in both the short run and the long run. In both the short run and the long run, price equals marginal revenue. The firm should increase output as long as marginal revenue exceeds marginal cost, and reduce output if marginal revenue is less than marginal cost. Profits are always maximized when marginal revenue equals marginal cost.

Chapter 14: Problems:Pages: 308

4. Here is the table showing costs, revenues, and profits:

Qty	Total Cost	Marginal Cost	Total Revenue	Marginal Revenue	Profit
0	\$8	---	\$0	---	\$-8
1	9	\$1	8	\$8	-1
2	10	1	16	8	6
3	11	1	24	8	13
4	13	2	32	8	19
5	19	6	40	8	21
6	27	8	48	8	21
7	37	10	56	8	19

- a. The firm should produce five or six units to maximize profit.

- b. Marginal revenue and marginal cost are graphed in Figure 4. The curves

cross at a quantity between five and six units, yielding the same answer as in Part (a).

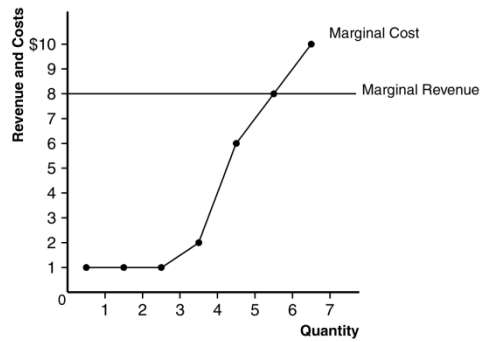


Figure 4

- c. This industry is competitive because marginal revenue is the same for each quantity. The industry is not in long-run equilibrium, because profit is not equal to zero.