

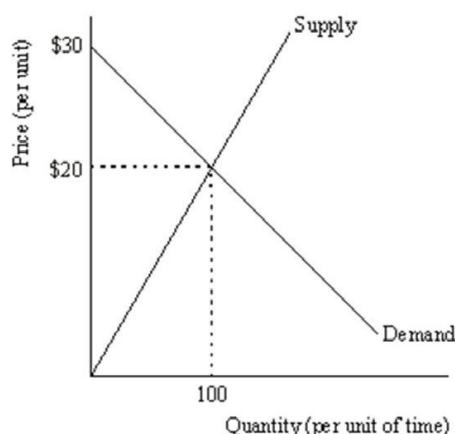
REVIEW QUESTIONS FOR SECOND MIDTERM (CHAPTERS 7-12)

1. Define consumer surplus and producer surplus. Explain why the equilibrium price and quantity maximizes the sum of producer plus consumer surplus (the total surplus).

Answer:

Consumer surplus is the value the consumer gets from buying a product less its price. Producer surplus is the price the producer sells a product for less the cost of producing it. At the equilibrium price all trades that add a net surplus are made. If quantity is limited to less than the equilibrium quantity or if prices are fixed at a level that reduces the equilibrium quantity, some potential trades that would otherwise have added a net surplus will not be made.

2. Use the diagram below to compute the dollar value of the consumer and producer surplus.



Answer:

Consumer surplus = $\frac{1}{2} \times 100 \times \$10 = \$500$; producer surplus = $\frac{1}{2} \times 100 \times \$20 = \$1,000$.

3. Suppose the price elasticity of demand is 1.5 and the price elasticity of supply is 0.5, what is the percentage of a tax borne by the consumer, and what is the percentage of the same tax borne by the producer?

Answer:

The percentage of the tax borne by the consumer is the price elasticity of supply divided by the sum of the price elasticities of demand and supply. This means that the consumer pays $0.5/(1.5+0.5) = 25\%$ of the tax. The producer's share of the tax is the remaining 75%, or the price elasticity of demand divided by the sum of the price elasticities of demand and supply.

4. Suppose the current equilibrium price of a good is \$10, the elasticity of demand is 0, and the elasticity of supply is 2. If the government levies a \$1 tax on the supplier, calculate the new equilibrium price and the percentage of the tax borne by both the demander and the supplier of the good.

Answer:

Note that demand is perfectly inelastic in this case (the demand curve is vertical). The price rises by the entire amount of the tax to \$11. The percentage of the tax borne by the consumer is the price elasticity of supply divided by the sum of the price elasticities of demand and supply. That is, the consumer's share of the tax is $2/(0+2) = 100\%$ of the tax. The producer's share in this case is the price elasticity of demand divided by the sum of the price elasticities of demand and supply, which equals 0% ($0/0+2$).

5. What are three major sources of market failure?

Answer:

Three main sources of market failure are externalities, public goods, and imperfect information.

6. What are the three alternative methods of dealing with externalities? Briefly explain each one.

Answer:

The three methods are:

- (a) Direct regulation: The amount of a good people (or firms) are allowed to consume (or produce) is directly limited by the government.
- (b) Incentive policies: There are two types of incentive policies: (1) impose a tax incentive to achieve the desired reduction, and (2) to create property rights in permits to pollute, and allow people to trade these permits freely.
- (c) Voluntary reductions: To make the reduction in output voluntary by leaving individuals free to do what is socially optimal or what is privately optimal.

7. The following table shows the marginal private cost (MPC) and the marginal social cost (MSC) of a chemical factory.

Tons of Chemicals	MPC	MSC
1	100	120
2	110	130
3	120	140
4	130	150
5	140	160

Answer the following questions:

- (1) What is the marginal cost of the factory's externality? Is it constant at all quantities?
- (2) If the factory is a perfectly competitive firm and is not required by the government to internalize its external cost, how many tons should the factory produce, given that the market price of a ton of chemicals is \$130?
- (3) If the factory is a perfectly competitive firm and is required by the government to internalize its external cost, how many tons should the factory produce, given that the market price of a ton of chemicals is \$130?
- (4) Draw a graph illustrating your answers.

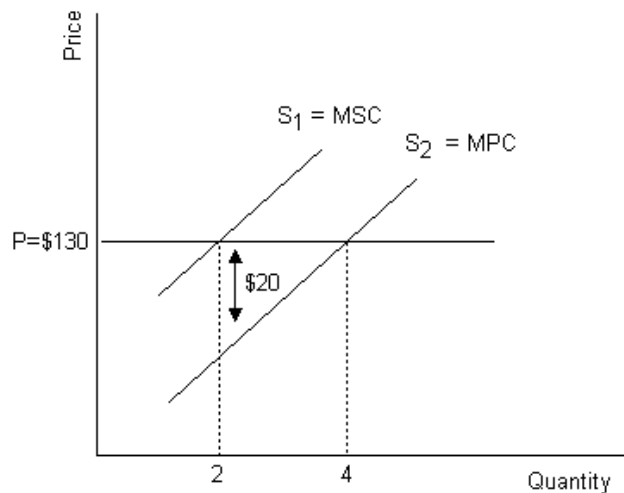
Answer:

(1) The marginal cost of the factory's externality is \$20 per ton (the difference between MSC and MPC). It is constant at all quantities.

(2) To maximize profit, the perfectly competitive factory will produce the quantity where the market price of chemicals equals marginal private cost. This point occurs at $Q = 4$ tons.

(3) In this case, the relevant marginal cost is the MSC. Therefore, the perfectly competitive factory will produce at the point where $P = MSC$. The factory will produce 2 tons.

(4) The graph:



8. What is an optimal policy? If a policy is not optimal, what does it imply in terms of utilization of resources?

Answer:

An optimal policy is a policy in which the marginal cost of undertaking the policy equals the marginal benefit of that policy. If the marginal cost of undertaking the policy does not equal the marginal benefit, the policy is not optimal. If the marginal cost exceeds marginal benefit, there is too much of the activity and it should be curtailed. That is, resources are being wasted because the savings from a reduction of expenditures on the program's activities will be worth more than the gains that would be lost from reducing the program. If the marginal benefit exceeds marginal cost, there is too little of the activity and it should be augmented. That is the gain that would come from expanding the program will exceed the value of the additional resources used for that purpose.

9. What is a public good? Give two examples of a public good.

Answer:

A public good is a good that is nonexclusive (no one can be excluded from its benefits) and nonrival (consumption by one does not preclude consumption by others). There are many possible examples of public goods, two of which are national defense and police protection.

10. What problems are associated with determining how much of a public good should be provided?

Answer:

The problems associated with the provision of public goods include the following. First, it may be difficult to decide what is a public good since what is and is not a public good depends upon technology. For example roads used to be privately provided when the main mode of transportation was the horse and buggy and toll collection was easy. But with the advent of the automobile, toll collection became difficult and roads became more like public goods. A second problem is that it is difficult to determine how much consumers are willing to pay for public goods. This is the case because once a public good is provided to one consumer all consumers may use it (so there is little incentive to reveal how much it is worth to you). Surveys may not provide accurate information because respondents have an incentive to overstate or understate their true willingness to pay for public goods.

11. Why can imperfect information lead to market failure?

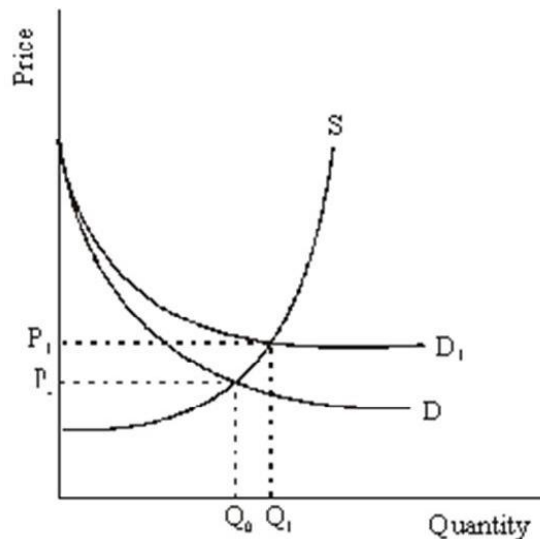
Answer:

If buyers have imperfect information, they can make mistakes in purchasing decisions. An example would be if consumers have false information regarding the quality of a product they are contemplating to buy. They may buy too little or too much of it (a point where marginal benefit does not equal marginal cost), hence creating a market failure. If consumers have no way of identifying exceptionally good products, they will not pay a premium for them and the markets for those superior products will disappear.

12. Demonstrate graphically and explain verbally the impact of a positive externality on a supply and demand market outcome.

Answer:

The presence of a positive externality results in not enough of a good being provided at too low a price - when viewed from society's point of view. The reason for this is that the demand curve that represents the marginal private benefit of the good is not the true (complete) marginal social benefit (which includes the benefits derived from the positive externality). In the diagram this is shown by D_1 (marginal social benefit) above D (private social benefit). The market outcome occurs where supply (marginal social benefit) intersects D , giving us quantity Q_0 and price P_0 . The socially preferred outcome occurs where supply intersects D_1 , giving us quantity Q_1 and price P_1 . In comparing the socially desirable outcome to the market outcome we see that output and price are both too low: ($Q_0 < Q_1$) and ($P_0 < P_1$), respectively.



13. Define total utility and marginal utility and explain the relationship between them. Give an example.

Answer:

Total utility is the satisfaction one gets from one's entire consumption of a product. Marginal utility is the additional satisfaction one gets from consuming one additional unit of a product, beyond what has already been consumed (having "one more"). In general, consuming an additional unit will contribute some marginal utility to total utility, but less than that of previous units. That is, as consumption increases, marginal utility declines. For example, the first potato chip one consumes might contribute 10 units of utility (the marginal utility of the first chip is 10, total utility after consuming one chip is 10 units of utility). Additional chips will yield less satisfaction. After 50 chips have been consumed, the marginal utility of the 51st might be only 5 units of utility, and the marginal utility of the 101st might be zero (full of chips!).

14. Suppose that every time you go to the library to study economics you buy yourself soda (S) and candy bars (C) as an incentive to study. Having mastered the material on rational choice you always allocate your study snack budget so that $MU_S/P_S = MU_C/P_C$. What should you do if one night you discover that the price of a can of soda has increased?

Answer:

An increase in the price of a can of soda will mean that MU_S/P_S has decreased so that now $MU_S/P_S < MU_C/P_C$. The principle of rational choice tells you to increase your consumption of candy (which will decrease MU_C) and decrease your consumption of soda (which will increase MU_S) until you have once again arrived at a study snack for which $MU_S/P_S = MU_C/P_C$.

15. You have \$5 to spend on any combination of goods A and B. The price of good A is \$2 and the price of good B is \$1. You have calculated the following utility values for yourself:

Units	TU _A	MU _A	MU _A /P _A	TU _B	MU _B	MU _B /P _B
0	0			0		
1	16			30		
2	30			50		
3	40			58		
4	46			64		

(a) Fill in the empty columns of the table.

(b) You have purchased 2 units of good A and 1 unit of good B. Are you maximizing your utility? If so, explain why. If not, what combination of goods should you buy?

Answer:

(a) The completed table:

Units	TU _A	MU _A	MU _A /P _A	TU _B	MU _B	MU _B /P _B
0	0			0		
1	16	16	8	30	30	30
2	30	14	7	50	20	20
3	40	10	5	58	8	8
4	46	6	3	64	6	6

(b) If you purchase 2 of A and 1 of B you are not maximizing your utility. To see why not, use the utility maximizing rule. For good A, $MU_A/P_A = 7$ and for good B, $MU_B/P_B = 30$. Since $MU_B/P_B > MU_A/P_A$ you are not maximizing utility; you should buy more B and less A. The utility maximizing combination is to buy 1 of A and 3 of B. With this combination, $MU_A/P_A = 8 = MU_B/P_B$.

16. Describe how the principle of diminishing marginal utility underlies the law of demand.

Answer:

The principle of diminishing marginal utility says that as you consume more of a good, after some point the marginal utility received from each additional unit of the good decreases with each additional unit consumed.

The law of demand states that:

Quantity demanded rises as price falls, other things constant.

Quantity demanded falls as price rises, other things constant.

The former underlies the latter in that it describes the reason for the inverse relationship between price and quantity demanded that is part of the law of demand. Consider a consumer who is at a utility maximizing consumption level of two goods (A and B) such that $MU_A/P_A = MU_B/P_B$. Now suppose that the price of good B increases. This results in a decrease in MU_B/P_B so that we now have $MU_A/P_A > MU_B/P_B$. The consumer is not maximizing utility. To satisfy the utility maximizing rule, the consumer must increase consumption of good A and decrease consumption of good B. This will decrease MU_A/P_A and increase MU_B/P_B (both changes as a result of the principle of diminishing marginal utility: buy more A and MU_A decreases; buy less B and MU_B increases) until once again $MU_A/P_A = MU_B/P_B$. The utility analysis tells us that when the price of B increases our consumer will buy less of it – which is

precisely what the law of demand says. Since the utility analysis works because of the principle of diminishing marginal utility, this is how the principle of diminishing marginal utility underlies the law of demand.

17. Zach has \$100 to spend on meals at restaurants and movie theatre tickets. The price of a meal is \$10 and the price of a movie ticket is \$5. At equilibrium, Zach goes to the movies 10 times and eats in the restaurant 5 times a month. (Appendix)

(a) Draw Zach's budget constraint and an indifference curve showing his equilibrium.

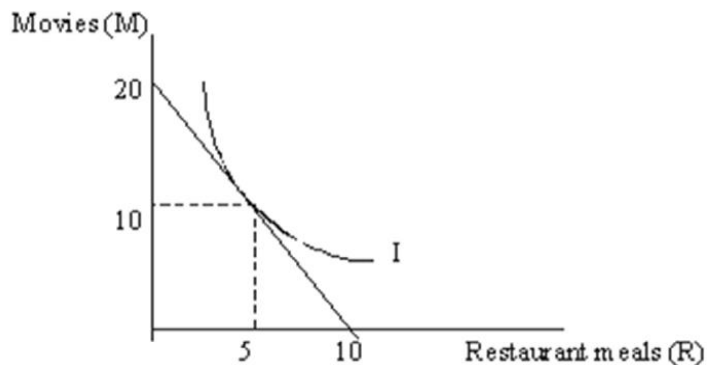
(b) What is the relationship between the marginal utility of a meal in a restaurant and the marginal utility of a movie at the current equilibrium condition?

(c) If the price of a meal drops to \$5 a meal, show graphically how equilibrium changes.

(d) If Zach's budget increases to \$200 and prices remain constant (\$5 a movie and \$10 a meal), show graphically how equilibrium changes.

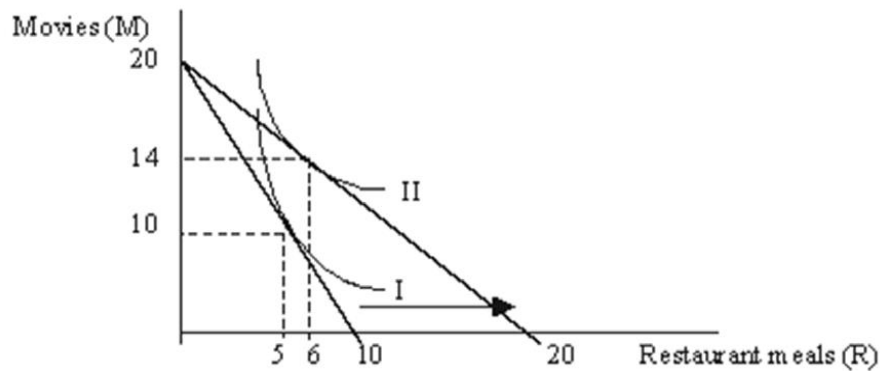
Answer:

(a) The diagram:



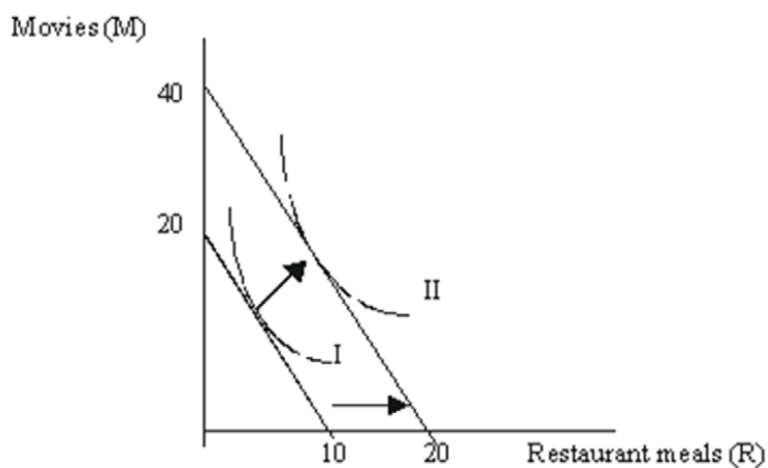
(b) At equilibrium, the marginal rate of substitution (the marginal utility of meals, MU_R , divided by the marginal utility of movies, MU_M) must equal the price ratio (the price of meals, P_R , divided by the price of movies, P_M). Therefore, $MU_R/MU_M = 10/5$. Or, $MU_R = 2MU_M$, i.e., the marginal utility of having a meal at a restaurant is twice as much as going to the movie theatre, given Zach's budget and price of both goods.

(c) The diagram:

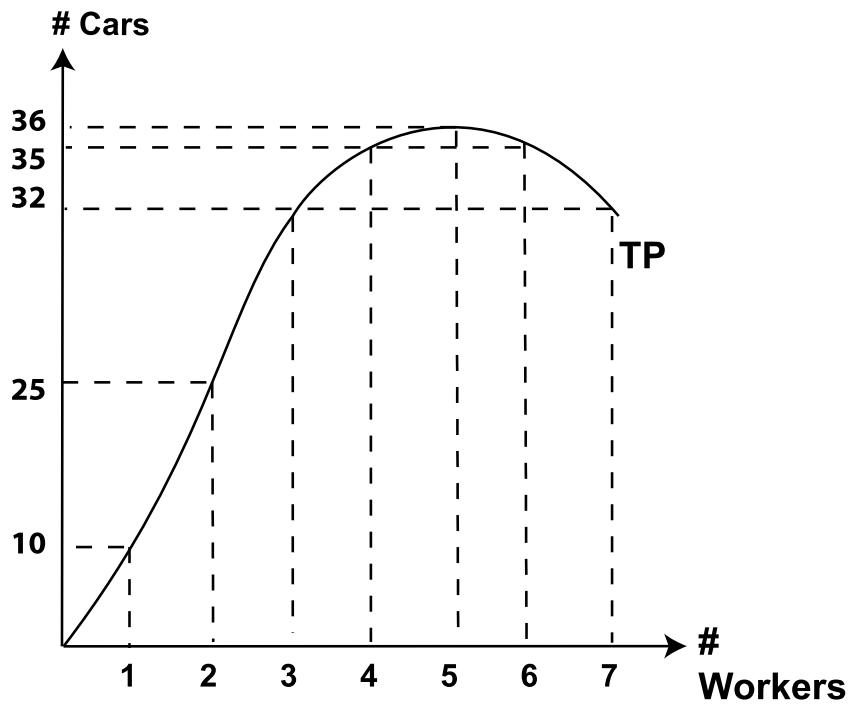


In this case, the budget constraint rotates as shown in the diagram above. Equilibrium moves up on a higher indifference curve (from I to II). If Zach elects to eat one additional time in the restaurant after the decline in the price of meals (for a total of 6 times), he can afford watching 4 additional movies (for a total of 14 movies).

(d) The diagram:



18. The diagram below shows the production function for Clean-Like-New car wash business.



(a) Compute the total product, marginal product, and the average product values in the following table:

Number of Workers	Total Product	Marginal Product	Average Product
0			
1			
2			
3			
4			
5			
6			
7			

(b) Where does increasing marginal productivity occur?

(c) Where does diminishing marginal productivity occur?

(d) Where does diminishing absolute productivity occur?

Answer:

(a)

Number of Workers	Total Product	Marginal Product	Average Product
0	0	0	0
1	10	10	10
2	25	15	12.5
3	32	7	10.6
4	35	3	8.75
5	36	1	7.2
6	35	-1	5.8
7	32	-3	4.6

(b) Increasing marginal productivity occurs between the first and second workers. This is because marginal product is rising in that range.

(c) Diminishing marginal productivity occurs between the third and the fifth worker. This is because marginal product is declining in that range.

(d) Diminishing absolute productivity occurs after the fifth worker. This is because marginal product is negative in that range.

19. (a) Calculate marginal costs, total costs, average fixed costs, average variable costs and average total costs, given the following table. Costs are \$100 when there is no production. Round off to the nearest whole number.

Output	Variable Cost	Marginal Cost	Total Cost	Average Fixed Cost	Average Variable Cost	Average Total Cost
0	0	0				
1	60	60				
2	90	30				
3	110	20				
4	150	40				
5	230	80				
6	350	120				
7	510	160				
8	710	200				

(b) Between what levels of output is there increasing marginal productivity?

(c) If labor were the only input to this production process, between what levels of output is the marginal product of labor falling?

Answer:

(a) See the following table:

Output	Variable Cost	Marginal Cost	Total Cost	Average Fixed Cost	Average Variable Cost	Average Total Cost
0	0	0	100			
1	60	60	160	100	50	160
2	90	30	190	50	45	95
3	110	20	210	33	37	70
4	150	40	250	25	38	63
5	230	80	330	20	46	66
6	350	120	450	17	58	75
7	510	160	610	14	73	87
8	710	200	810	13	89	101

Note: Marginal cost is cost between levels of output. These values are rounded off to the nearest whole number.

(b) There are increasing marginal returns between 1 and 3 units of output. That is where marginal cost is falling.

(c) Marginal product of labor is falling where marginal cost is rising: from 3 to 8 units of output.

20. How is accounting profit different from economic profit? How are they the same?

Answer:

The similarity is that both measure profit as revenues less costs. The difference occurs in that economists include explicit and implicit revenues and costs in their calculations whereas accountants only include explicit revenues and costs.

21. Give the definition of marginal product and average product and explain why if the marginal product is smaller than the average product, the average product must be decreasing.

Answer:

Marginal product is the additional output produced by using one more unit of one of the inputs, with other inputs held constant. Average product is total output divided by the quantity of the input. The relationship between average and marginal values is easiest to see with an example. Suppose the average age of persons in a room is 25 years old. Now suppose a person of less than the average age, such as a 20 years old, enters the room. Now the average age of persons in the room will be a little less than 25 years. If another person 20 years old enters, the average will be pulled down a little further. In general, average values are pulled toward marginal values. If marginal product is below average product, average product will fall.

22. In which part of the production function (increasing marginal productivity, diminishing marginal productivity, or diminishing absolute productivity) is a firm most likely to operate? Explain.

Answer:

A firm is most likely to operate in the area of the production function where there is diminishing marginal productivity. The reason for this is that the firm will not want to be in either the area of increasing marginal productivity or the area of decreasing absolute productivity. If the firm is operating in the area of increasing marginal productivity this means it can increase its existing worker's output by hiring more workers - so the firm will want to hire more workers and move out of this range of the production function. If the firm is operating in the area of diminishing absolute productivity this means that hiring additional workers actually cuts total output - so the firm will want to lay off workers and move out of this range of the production function.

23. What is the law of diminishing marginal productivity?

Answer:

The law of diminishing marginal productivity states that as more and more of a variable input is added to an existing fixed input, eventually the additional output one gets from that additional unit of input is going to fall.

24. Explain why the ATC and AVC curves get closer and closer together as output increases.

Answer:

The reason that the ATC and AVC curves get closer and closer together as output increases is because of what is happening to AFC. We know that $ATC = AVC + AFC$; as output increases AFC is continuously declining so that the distance between ATC and AVC is also continuously declining.

25. Explain the relationship between marginal cost (MC) and average total cost (ATC).

Answer:

If ATC is above MC, ATC is falling. If ATC is below MC, ATC is rising. If ATC equals MC, ATC is at its minimum.

26. Why does the minimum point of the AVC curve always occur at a lower output level than that at which the ATC curve has its minimum?

Answer:

The minimum of the AVC curve occurs to the left of (at a lower output level than) the minimum of the ATC curve because of the presence of AFC. After the AVC curve starts to rise, the AFC curve continues to fall. It takes a while before the rising AVC curve overcomes the falling AFC curve and causes the ATC curve to rise.

27. Why is it that a technically efficient method of producing may not be an economically efficient method of production?

Answer:

Technical efficiency describes a production process that produces the greatest possible level of output from any given mix of inputs. Economic efficiency is production of any given level of output at minimum cost. Technical efficiency means no inputs are wasted. Economic efficiency means no money is wasted. Economic efficiency always implies technical

efficiency, since if inputs are being wasted production cannot be taking place at minimum cost. But technical efficiency does not imply economic efficiency. Production may be possible using a number of different mixes of inputs (for example, using a labor intensive technique or a capital intensive technique). For any given mix of inputs, technical efficiency means the maximum output for those inputs has been achieved. But one mix of inputs may be much more expensive than another. The more expensive technique is not economically efficient, though it may be technically efficient.

28. What are economies of scale? How do economies and diseconomies of scale influence the shape of the long run cost curves? How do economies of scale relate to indivisible setup costs? What are diseconomies of scale and how do they arise?

Answer:

Economies of scale relate to the greater percentage change in output associated with an equal percentage change in all inputs, and thus is necessarily a long-run concept.

The Long Run Average Total Cost Curve (LRATC) curve gets its U shape from (first) economies and (second) diseconomies of scale. Economies of scale explain the downward slope of the LRATC curve. Constant returns to scale explain the flat part of the LRATC curve. Diseconomies of scale explain the upward slope of the LRATC curve.

Indivisible setup costs are costs associated with an indivisible input. Some inputs, such as specialized capital goods used in production, cannot be made for a small scale of output. A petroleum refinery cannot simply be “scaled down” to produce 100 gallons of gasoline a year. Equipment to produce on such a small scale would be completely different, and would have vastly greater unit costs of operation. To produce gasoline at all, realistically, requires a large refinery. This is an indivisible setup cost, which must be recouped if there is to be any profit. A larger level of output will spread these setup costs over more output, reducing unit costs.

Diseconomies of scale refer to the smaller percentage increase in production that occurs when there are equal percentage increases of all inputs. They can arise because of increased monitoring costs and loss of team spirit.

29. How does the envelope relationship relate short run average cost and long run average cost?

Answer:

The envelope relationship relates short-run and long run average total cost. At the planned output level, short-run average total cost and long-run average total cost are equal, but at all other levels of output, short-run average total cost is higher than long-run average total cost. The Long Run Average Total Cost (LRATC) curve is created by connecting the points on the lowest Short Run Average Total Cost (SRATC) curve for any given level of output. These points are usually not the lowest points on these SRATC curves.

30. In the basic model, cost changes only as output changes. In the real world, at least four other factors affect real-world costs. They are: (1) economies of scope, (2) learning by doing and technological change, (3) multidimensionality, and (4) unmeasured costs. Explain how each of these influences cost analysis.

Answer:

(1) Economies of scope occur when costs are interdependent, being affected by the production of other goods. Often producing good X (for example, railroad track) makes it cheaper to produce another good (for example, structural steel beams). Therefore the product mix of the enterprise is an important entrepreneurial decision affecting costs. (2) Learning by doing and technological change both shift cost curves downward. Typically, continued production under the same technique produces declining unit costs as a result of the fact that the employees are learning by doing. Technological change can shift cost curves, but this is less predictable than learning by doing. (3) In the real world decisions must be made over a multiplicity of dimensions, rather than just the output dimension considered in the standard model. These decisions concern matters such as quality of the product, location of the plant and advertising, and how these factors impact costs. Firms choose more than their level of output. They choose their product mix, location, quality, inventory, packaging, marketing, speed of delivery, and many other important variables. (4) Not all economically relevant costs (opportunity costs) can be measured easily, so cost to the economist is different from cost to the accountant. These difficult to measure costs nonetheless enter into entrepreneurial decision making as foregone opportunities. The entrepreneur must form a judgment as to the value of these costs, and make his or her decisions on the basis of this judgment.

31. The SRATC and LRATC curves are both typically U-shaped for different reasons. Explain why.

Answer:

The SRATC curves get their U shape from the increasing and then decreasing marginal productivity of the variable inputs that exists in the short run (where there are fixed inputs). The LRATC curve gets its U shape from (first) economies and (second) diseconomies of scale. Economies of scale relate to the change in output associated with an equal percentage change in all inputs, and thus is necessarily a long-run concept.

32.

(a) Draw an example of a long-run average cost curve. Find the minimum point of the long run average cost curve and label that point “A” for reference. What is the slope of the LRATC curve to the left of point A? Why does it have this slope? What is the slope of the LRATC curve to the right of point A? Why does it have this slope?

(b) Choose a point to the left of point A on the LRATC curve, and label it point B for reference. Choose a point to the right of point A on the LRATC curve. Label it point C for reference. Draw the SRATC curve associated with point A and label it SRATCa. Is point A the minimum point of SRATCa? Why does SRATCa have the slope that it does at points to the left and right of point A?

(c) Draw SRATC curves associated with points B and C and label them SRATCb and SRATCc. Are points B and C minimum points for SRATCb and SRATCc? Explain.

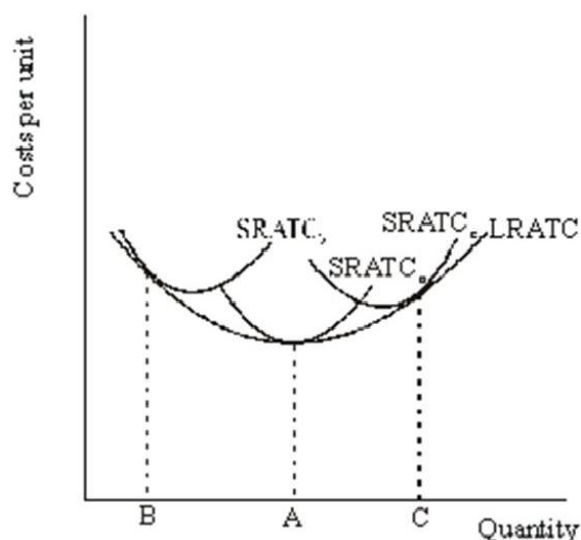
Answer:

See the graph below.

(a) Points to the left of A (the minimum point) on the LRATC curve will be on the downward sloping portion of the curve. To the left of point A, LRATC slopes downward because of economies of scale. Points to the right of point A are on the upward sloping portion of the LRATC curve. To the right of A, LRATC slopes upward because of diseconomies of scale.

(b) Point A is the minimum point for $SRATC_a$. To the left of point A, $SRATC_a$ will be downward sloping. The downward slope of that portion of $SRATC$ is a result of declining average fixed cost (AFC) and increasing returns to a variable factor (both of which cause $SRATC$ to fall). The upward sloping portion of the curve (to the right of point A) is upward sloping because of diminishing returns to a variable factor.

(c) $SRATC_b$ and $SRATC_c$ are not tangent to $LRATC$ at their minimum points. Why? In the short run, at least one input is fixed and its costs are part of average fixed costs. In the long run all costs are variable and all inputs can be changed, allowing for a more efficient (lower cost) combination of inputs.



33. What are economies of scale? How do economies and diseconomies of scale influence the shape of the long run cost curves? How do economies of scale relate to indivisible setup costs? What are diseconomies of scale and how do they arise?

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36. What concept is important in determining the shape of short run cost curves (marginal cost, average cost) but plays no role in determining the shape of long-run cost curves? What are the most important factors in determining the shape of the long-run cost curves? Explain.

Answer:

The dominant concept in determining the shape of short-run cost curves is diminishing marginal productivity. Diminishing marginal productivity plays no role in determining the shape of the long-run cost curves, because diminishing marginal productivity is a consequence of increasing the use of variable inputs while fixed input remains constant. In the long run there is no fixed input. The dominant concepts in determining the shape of long-run cost curves are economies of scale and diseconomies of scale. Even with all inputs variable, it will prove much cheaper per ton to produce 1,000,000 tons of steel per year than 10 pounds per year.

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38. Describe how a market supply curve relates to a firm's supply curve. How does the short-run market supply curve differ from the long run market supply curve?

Answer:

(a) In the short run, when the number of firms in the market is fixed, the market supply curve is the horizontal summation of all the firms' Marginal Cost Curves, taking into account any changes in input prices that might occur. To move from individual firm's Marginal Cost Curves to the market supply curve, we add the quantities all firms will supply at each possible price. Since all firms have identical Marginal Cost Curves, a quick way of doing this is to multiply the quantities from the cost curve of any firm by the number of firms in the market.

(b) As the short run evolves into the long run, the number of firms can change. If more firms enter the market, the supply curve will shift to the right. If some firms exit the market, the supply curve will shift to the left.