

Self-Test 3 (KEY)

Cost, Supply & Competitive Markets

The tasks in this self-test are designed to be solvable by any student who has mastered the material. The answers provided are written instructionally to walk you through the problem-solving process for each task. A well-prepared student should score between 9 and 11 out of 12 without assistance from AI or others. A 12 out of 12 — without help — requires outlier performance or sheer luck. This self-test is optional, and your result will not count towards your grade. Direct any questions to your section's TA.

1. A car manufacturer can produce 100 cars per day in four different ways: (i) using 120 workers and 40 robots; (ii) using 100 workers and 60 robots; (iii) using 70 workers and 50 robots; (iv) using 50 workers and 70 robots. Which of the following statements is correct?
 - A. Combination (i) is less efficient than (ii). *[We cannot tell — (ii) uses fewer workers but more robots than (i)]*
 - B. Combination (ii) is less efficient than (iii).** *[Combination (iii) uses both fewer workers and fewer robots than (ii) to produce the same output, so (ii) is dominated]*
 - C. Combination (iii) is less efficient than (iv). *[We cannot tell — (iv) uses fewer workers but more robots than (iii)]*
 - D. None of the above.

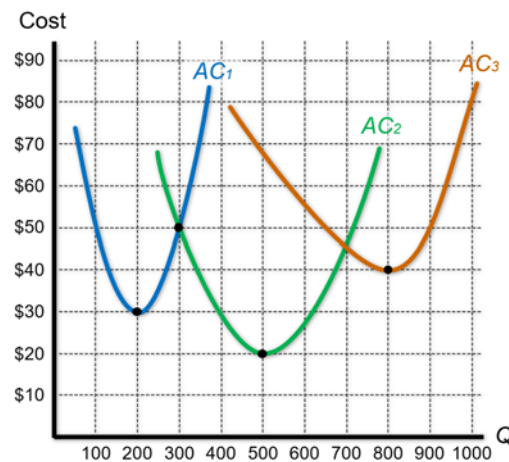
2. Which of the following best describes how a firm's average fixed cost (FC/Q) changes as production expands?
 - A. It is constant.
 - B. It is increasing.
 - C. It is decreasing.**
 - D. It is U-shaped.

[Fixed cost is constant by definition, while output rises. Therefore, average fixed cost (FC/Q) falls continuously as production expands]

3. Which of the following will affect the marginal cost of a transportation company?
 - A. The price of petrol.** *[Fuel is a variable cost — changes in its price affect the cost of each additional unit of output]*
 - B. The purchase of a new truck. *[The purchase price of a vehicle is a fixed cost — it does not affect the cost of producing each additional unit]*
 - C. Both A and B.
 - D. None of the above.

4. Which of the following is most likely to be a sunk cost for a hospital?
 - A. Expenditure on training its doctors on the new IT system the hospital uses.** *[Training in a hospital-specific system has no value outside this hospital — the cost cannot be recovered]*
 - B. Expenditure on a new ambulance. *[Ambulances could be resold — most of the cost is recoverable]*
 - C. Expenditure on imported pharmaceutical drugs purchased in bulk. *[Pharmaceuticals can be resold to other hospitals or distributors — the cost is largely recoverable]*
 - D. All of the above.

5. The figure depicts the average cost curves for three different scales of operation of a firm. The firm currently produces 300 units of output using scale AC_1 . In the long run, what is the minimum average cost the firm can achieve?



- A. \$20.
- B. \$30.
- C. \$40.
- D. \$50.

[In the long run, the firm can change both its scale of operation and its level of output. The minimum average cost achievable across all scales and output levels is \$20, at the minimum of AC_2 , at $q = 500$]

6. Which of the following statements best captures the Law of Diminishing Returns?
- A. Successive price increases of a good cause its total revenue to decline. *[This describes diminishing marginal revenue, not diminishing returns]*
 - B. **As more units of a variable input are added to a fixed input, the additional output produced eventually falls.** *[The Law of Diminishing Returns: with at least one fixed input, the marginal product of the variable input eventually decreases]*
 - C. As the price of a good rises, the quantity demanded falls, holding everything else constant. *[This is the Law of Demand, not the Law of Diminishing Returns]*
 - D. As more firms enter a competitive industry, the profit earned by each individual firm declines. *[This describes the long-run adjustment in perfect competition, not diminishing returns]*
7. Which of the following is a feature of a perfectly competitive market?
- A. Larger firms can negotiate better prices than smaller firms. *[No firm has bargaining power over price in perfect competition]*
 - B. Sellers can charge different prices depending on their size. *[In perfect competition, all firms charge the same market price regardless of size]*
 - C. Buyers, but not sellers, can influence the market price. *[Neither buyers nor sellers individually influence the market price in perfect competition]*
 - D. **None of the above.**

8. According to the table, which of the following is best for this firm if its fixed cost is \$50 and the market price for the product is \$30?

q	MC	AC
1	\$20	\$70
2	\$22	\$46
3	\$25	\$39
4	\$27	\$36
5	\$29	\$34
6	\$36	\$34
7	\$45	\$36

- A. To keep operating indefinitely.
 B. To shut down in the short run.
 C. **To exit the market in the long run.**

[At $p = \$30$, the closest MC value is at $q = 5$ ($MC = \$29$), so the firm should produce 5 units. At this output, $AC = \$34$ and $AVC = AC - AFC = \$34 - \$50/5 = \$24$. Since $AVC < p < AC$, the firm covers its variable costs but cannot cover total costs. It should keep operating in the short run but exit in the long run]

9. Suppose the market for wheat is perfectly competitive, and the market demand is inelastic. A wheat farmer believes she can increase her revenue by raising her selling price. Is she correct?

- A. Yes.
 B. **No.**

[In a perfectly competitive market, individual firms are price takers — they cannot set their own price. If the farmer raises her price above the market price, she will sell nothing. The inelasticity of market demand applies to the market as a whole, not to a single seller]

10. In the short run, suppose there are 80 identical, perfectly competitive firms. Each firm earns \$12,000 in revenue, with variable costs of \$9,000 and fixed costs of \$5,000. How many firms will there be in this industry in the long run?

- A. None.
 B. **Fewer than 80.**
 C. 80.
 D. More than 80.
 E. There is insufficient information to determine the answer.

[Each firm earns revenue of \$12,000 against total cost of \$14,000 ($\$9,000 + \$5,000$) — a loss of \$2,000. Since revenue exceeds variable cost, firms continue operating in the short run, but losses trigger exit in the long run, reducing the number of firms. Not all firms will exit because exit will decrease the market supply, and price will increase to a level that can sustain a positive number of firms below 80]

11. Which of the following correctly describes the quantity supplied of a good?

- A. It is fixed by the size of the producing firm. *[Firm size influences capacity, but quantity supplied responds to price, not firm size alone]*
 B. It rises proportionally with consumer income. *[Consumer income affects demand, not supply directly]*
 C. It always exceeds the quantity demanded in any market. *[Quantity supplied exceeds quantity demanded only when the price is above equilibrium — not always]*
 D. **None of the above.**

12. Almonds are a normal good. In 2018, the equilibrium price of almonds was \$12 per kg and the equilibrium quantity was 500 tons. By 2022, the equilibrium price had risen to \$18 per kg while the equilibrium quantity had fallen to 420 tons. All else equal, which of the following could explain this change?

- A. A leftward shift of the demand curve for almonds.
- B. A rightward shift of the demand curve for almonds.
- C. A leftward shift of the supply curve of almonds.**
- D. A rightward shift of the supply curve of almonds.

[An increase in demand would have caused increase in both price and quantity.

A decrease in demand would have caused decrease in both price and quantity.

An increase in supply would have caused decrease in price and increase in quantity.

A decrease in supply would have caused increase in price and decrease in quantity, which is the case here]

Good afternoon! "A student spends 20 minutes struggling with a single task on his homework. He works as hard as he can and finally decides to pick option C. A few days later, while checking the answer key, he realizes that the correct answer was actually B. Reading the solution, he understands why, but he feels frustrated and disappointed. Despite his hard work, he still lost all points on that task and believes his effort was wasted. A few weeks later, he encounters a similar question on the exam. This time, it takes him only a few seconds to figure out the correct answer. Now, he won't fall into the same trap again, he is experienced, he has learned from his previous mistake. After submitting his exam, he realizes that the points he lost on the homework were a small price to pay for the much more valuable exam points he gained. Now, he understands that losing those homework points wasn't such a bad deal after all. There is no better investment in life than learning from your mistakes.

Kosmas

Please report any typos, mistakes, or suggestions for improvement to kmarinakis@smu.edu.sg.