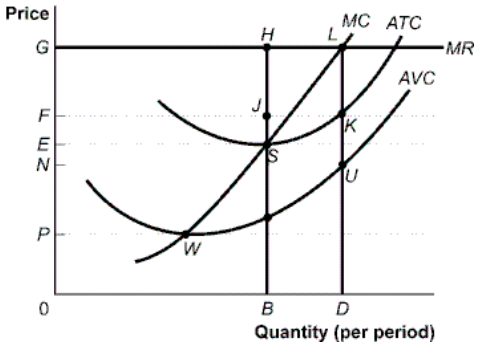
# Graphing Perfect Competition

Problem Set

*Use the graph below to answer questions 1-4*




1. The firm's total cost of producing its most profitable level of output is:
   a. *BS.*
   b. *DK.*
   c. *0FKD.*
   d. *0ESB.*
   e. *NFKU.*

2. The firm's total revenue from the sale of its most profitable level of output is:
   a. *0GLD.*
   b. *0GHB.*
   c. *BH.*
   d. *DL.*
   e. *NFKU.*

3. The firm's total economic profit at its most profitable level of output is:
   a. *0GHB.*
   b. *EFJS.*
   c. *EGHS.*
   d. *FGLK.*
   e. *NFKU.*

4. The firm will produce in the short run if the price is at least as much as the price indicated by the distance:
   a. *F.*
   b. *E.*
   c. *N.*
   d. *P.*
   e. *G.*

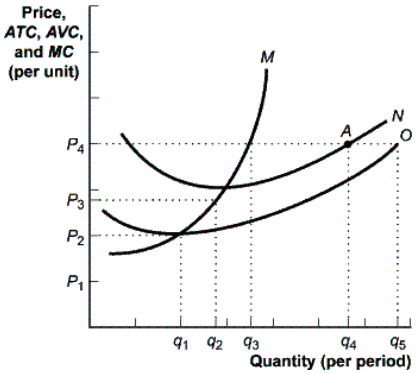
5. If price is currently between average variable cost and average total cost, then in the short run a perfectly competitive firm should:
   a. shut down.
   b. continue to produce to minimize losses.
   c. raise price.
   d. increase production to increase profit.
   e. reduce production to increase profit.

*Use the table below to answer question 6.*

| Quantity of Lawns | Variable Costs |
|---|---|
| 0 | $0 |
| 10 | 100 |
| 20 | 300 |
| 30 | 500 |
| 40 | 1,100 |
| 50 | 1,800 |

6. During the summer, Alex runs a lawn-mowing service, and lawn-mowing is a perfectly competitive industry. His only fixed cost is $1,000 for the mower. His variable costs include fuel and mower parts. He calculates the variable costs per lawn as shown in the table. What is Alex's break-even price?
   a. $100
   b. $10
   c. $50
   d. $27.50
   e. $75

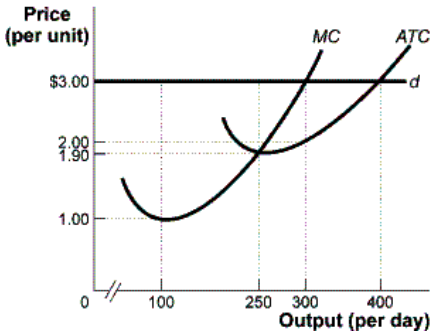
*Use the graph below to answer questions 7-8.*




7. If the market price is P4, the firm will produce quantity _____ and _____ in the short run.
   a. $q_1$; break even
   b. $q_3$; make a profit
   c. $q_4$; break even
   d. $q_5$; lose fixed costs
   e. $q_5$; make a profit

8. Which of the following statements is true?
   a. *AFC* is represented in this figure by the vertical distance between Curve *M* and Curve *N* at any level of output.
   b. Any price below $P_3$ will result in the firm shutting down in the short run.
   c. This figure illustrates the long run because all costs are variable.
   d. Quantity $q_2$ is to the left of the shut-down point.
   e. *AFC* is represented in this figure by the vertical distance between Curve *N* and Curve *O* at any level of output.

*Use the graph below to answer questions 9-11. The figure shows a perfectly competitive firm that faces demand curve d, has the cost curves shown, and maximizes profit.*

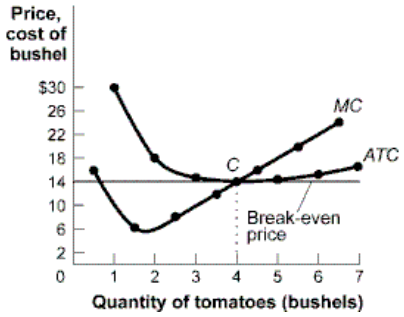



9. If the market price is $3.00, the firm will produce _____ units of output per day.
   a. 100
   b. 250
   c. 300
   d. 400
   e. 0

10. The firm's total cost per day is:
   a. $475.
   b. $300.
   c. $900.
   d. $1,200.
   e. $600.

11. If the firm faces a market price of $3.00, its total profit per day is:
   a. zero.
   b. $250.
   c. $275.
   d. $300.
   e. $200.

*Use the graph below to answer question 12.*




12. In the figure, total cost at the profit-maximizing quantity of bushels is $_____.
   a. 3.50
   b. 14
   c. 56
   d. 72
   e. 4

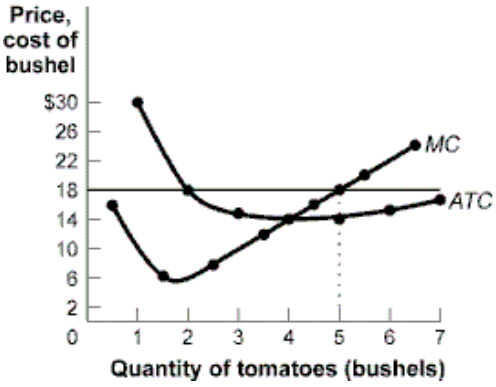
*Use the table below to answer questions 13-14.*

| Quantity per Period | Total Cost |
|---|---|
| 0 | $10 |
| 1 | 16 |
| 2 | 20 |
| 3 | 22 |
| 4 | 24 |
| 5 | 25 |
| 6 | 27 |
| 7 | 30 |
| 8 | 34 |
| 9 | 39 |
| 10 | 45 |

13. In the short run, the firm will produce, but at a loss, if the price is:
   a. $2.00.
   b. $2.50.
   c. $3.50.
   d. $4.50.
   e. $1.50.

14. The firm will stop production and shut down if the price is:
   a. $5.50.
   b. $3.50.
   c. $4.50.
   d. $5.00.
   e. $2.50.

*Use the graph below to answer question 15.*

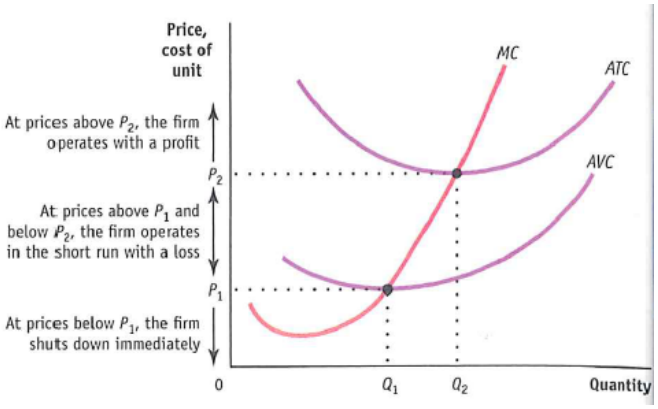



15. At the profit-maximizing quantity of output in the figure, total revenue is $_____, total cost is $_____, and profit is $_____.
   a. 90; 14; 76
   b. 90; 70; 20
   c. 30; 42; –12
   d. 48; 56; –8
   e. 70; 70; 0

16. The short-run supply curve for a perfectly competitive firm is its:
   a. demand curve above its marginal revenue curve.
   b. marginal revenue curve to the right of its marginal cost curve.
   c. marginal cost curve at all prices.
   d. average total cost curve below its marginal cost curve.
   e. marginal cost curve above its average variable cost curve.

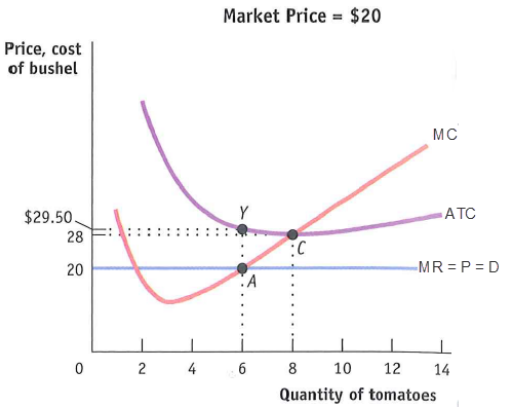
17. Which of the following is true?
    a. If price falls below average variable cost the firm will shut down in the short run.
    b. Total revenue and marginal revenue are the same in perfect competition.
    c. Economic profit per unit is found by subtracting *MC* from price.
    d. Economic profit is always positive in the long run.
    e. The marginal cost curve serves as the firm's supply curve above the break-even point.

18. Draw a short-run diagram showing a U-shaped average total cost curve, a U-shaped average variable cost curve, and a "swoosh"-shaped marginal cost curve. On it, indicate the range of output and the range of price for which the following actions are optimal.




    a. The firm shuts down immediately. The firm should shut down immediately when price is less than minimum average variable cost, the shut-down price. In the accompanying diagram, this is optimal for prices in the range from 0 to $P_1$.
    b. The firm operates in the short run despite sustaining a loss. When the price is greater than the minimum average variable cost (the shut-down price) but less than the minimum average total cost (the break-even price), the firm should continue to operate in the short run even though it is making a loss. This is optimal for prices in the range from $P_1$ to $P_2$.
    c. The firm operates while making a profit. When the price exceeds the minimum average total cost (the break-even price), the firm makes a profit. This happens for prices in excess of $P_2$.

19. Refer to the graph provided.




    a. Assuming it is appropriate for the firm to produce in the short run, what is the firm's profit-maximizing level of output? 6 (where MR=MC)
    b. Calculate the firm's total revenue. $20 X 6 = $120
    c. Calculate the firm's total cost. $29.50 X 6 = $177
    d. Calculate the firm's profit or loss. $120 - $177 = -$57 (or a loss of $57)
    e. If AVC were $22 at the profit-maximizing level of output, would the firm produce in the short run? Explain why or why not. No, because P < AVC

20. Daphne's apparel shop produces women's accessories in a perfectly competitive market. The market price of her accessories is $9 each. She employs variable inputs like labor and raw materials to the fixed input of her small shop.

| Production | *TFC* | *TVC* | *TC* | *MC* |
|---|---|---|---|---|
| 0 | $5 | $0 | $5 | --- |
| 1 | $5 | $6 | $11 | $6 |
| 2 | $5 | $11 | $16 | $5 |
| 3 | $5 | $13 | $18 | $2 |
| 4 | $5 | $18 | $23 | $5 |
| 5 | $5 | $25 | $30 | $7 |
| 6 | $5 | $34 | $39 | $9 |
| 7 | $5 | $49 | $54 | $15 |

    a. Use the optimal output rule to find the level of output that maximizes her economic profit in the short run. 6
    b. Calculate her economic profit or loss. $54 - $39 = $15
    c. What is her profit-maximizing level of output if price fell to $6? What is her economic profit or loss? The output that maximizes profit is 4. Economic profit/loss is $24 - $23 = $1

21. Kate's Katering provides catered meals, and the catered meals industry is perfectly competitive. Kate's machinery costs $100 per day and is the only fixed input. Her variable cost consists of the wages paid to the cooks and the food ingredients. The variable cost per day associated with each level of output is given in the accompanying table.

a. Calculate the total cost, the average variable cost, the average total cost, and the marginal cost for each quantity of output.

| Quantity of Meals | VC | TC | AVC | ATC | MC |
|---|---|---|---|---|---|
| 0 | $0 | $100 | --- | --- | --- |
| 10 | $200 | $300 | $20 | $30 | $20 |
| 20 | $300 | $400 | $15 | $20 | $10 |
| 30 | $480 | $580 | $16 | $19.33 | $18 |
| 40 | $700 | $800 | $17.50 | $20 | $22 |
| 50 | $1,000 | $1,100 | $20 | $22 | $30 |

b. What is the break-even price? What is the shut-down price?

Kate's break-even price, the minimum average total cost, is $19.33, at an output quantity of 30 meals. Kate's shut-down price, the minimum average variable cost, is $15, at an output of 20 meals.

c. Suppose that the price at which Kate can sell catered meals is $21 per meal. In the short run, will Kate earn a profit? In the short run, should she produce or shut down? Draw a correctly-labeled graph that shows this situation.

When the price is $21, Kate will make a profit: the price is above her break-even price. And since the price is above her shut-down price, Kate should produce in the short run, not shut down.

d. Suppose that the price at which Kate can sell catered meals is $17 per meal. In the short run, will Kate earn a profit? In the short run, should she produce or shut down? Draw a correctly-labeled graph that shows this situation.

When the price is $17, Kate will incur a loss: the price is below her break-even price. But since the price is above her shut-down price, Kate should produce in the short run, not shut down.

e. Suppose that the price at which Kate can sell catered meals is $13 per meal. In the short run, will Kate earn a profit? In the short run, should she produce or shut down? Draw a correctly-labeled graph that shows this situation.

When the price is $13, Kate will incur a loss: the price is below her break-even price. Also, since the price is below her shut-down price, Kate should shut down immediately to limit her losses to her fixed cost.