

**Cooleconomics.com**  
**Principles of Economics**

**Study Questions -- Costs**

1. Are each of the following true or false? *Carefully and logically* explain each of your answers in 1 or more sentences each. Do not repeat the statement or a slightly altered version of the statement in your response.

- a) When total product is zero, fixed costs are also zero.
- b) The Law of Diminishing Returns is unrealistic because it implies that we could feed the entire world from our back garden.
- c) In the short run a manufacturer can change the number of workers it hires, buy more land, and build a new plant.

2. Complete the following table: (Q=total product, TFC=total fixed cost, TVC=total variable cost, TC=total cost, MC=marginal cost, AFC=average fixed cost, AVC=average variable cost, ATC=average total cost). You should not “make up” any numbers!

<u>Q</u>	<u>TFC</u>	<u>TVC</u>	<u>TC</u>	<u>MC</u>	<u>AFC</u>	<u>AVC</u>	<u>ATC</u>
0	—	—	—	—	—	—	—
1	—	—	—	—	—	10	—
2	—	—	—	20	12	—	—
3	—	—	90	—	—	—	—
4	—	120	—	—	—	—	—

3. Draw the long run average cost curves for each of the following:

- a) A firm with constant returns to scale
- b) A firm with increasing returns to scale (a.k.a. “economies of scale”).
- c) A firm with increasing returns to scale at lower levels of production, and constant returns to scale at higher levels of production.

4. A firm is currently producing and selling 100 brushes for \$2 each. It has average fixed costs of 50 cents and average variable costs of 75 cents at this production level.

a) Calculate the firm’s total revenue, total fixed cost, total variable cost, and total profits at this production level.

b) Is this the short run or the long run for this firm? Explain your answer.

## Answers to Study Questions -- Costs

1. Are each of the following true or false? *Carefully and logically* explain each of your answers in 1 or more sentences each. Do not repeat the statement or a slightly altered version of the statement in your response.

a) When total product is zero, fixed costs are also zero.

*False in the short run. Fixed costs (such as fire insurance) must be paid even when there is no production.*

b) The Law of Diminishing Returns is unrealistic because it implies that we could feed the entire world from our back garden.

*Huh? False. Actually according to the law of diminishing returns there's no way we could feed the world from our back garden; as we add more and more workers to the fixed amount of land, the marginal product of each additional worker will fall so that she/he couldn't even produce enough food to feed herself/himself, let alone the whole world.*

c) In the short run a manufacturer can change the number of workers it hires, buy more land, and build a new plant.

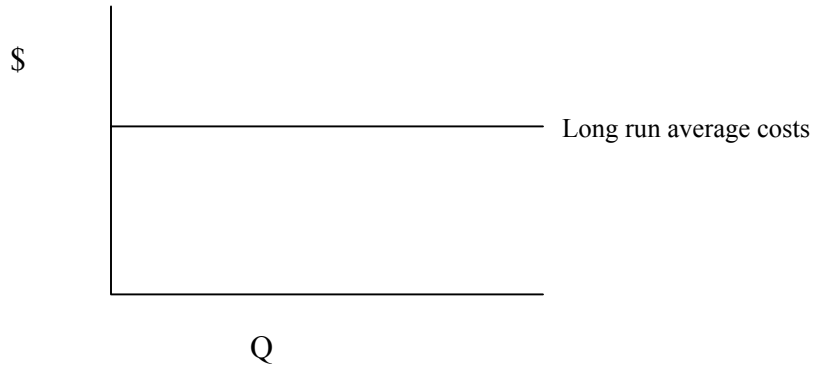
*False. One of these resources must be fixed, according to the definition of short run.*

2. Complete the following table: (Q=total product, TFC=total fixed cost, TVC=total variable cost, TC=total cost, MC=marginal cost, AFC=average fixed cost, AVC=average variable cost, ATC=average total cost). You should not "make up" any numbers!

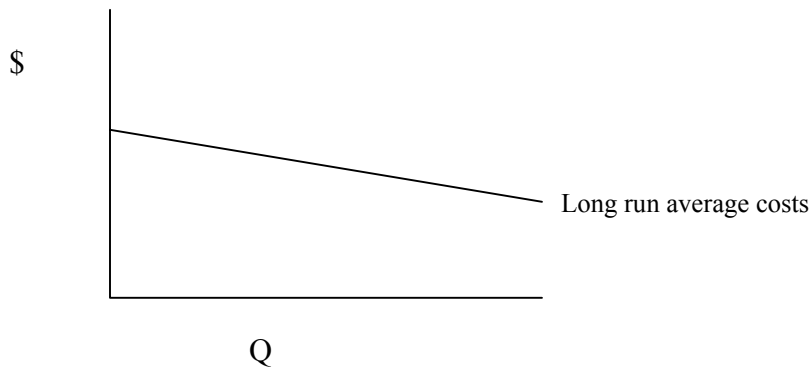
<u>Q</u>	<u>TFC</u>	<u>TVC</u>	<u>TC</u>	<u>MC</u>	<u>AFC</u>	<u>AVC</u>	<u>ATC</u>
0	<u>24</u>	<u>0</u>	<u>24</u>	<u>na</u>	<u>na</u>	<u>na</u>	<u>na</u>
1	<u>24</u>	<u>10</u>	<u>34</u>	<u>10</u>	<u>24</u>	<u>10</u>	<u>34</u>
2	<u>24</u>	<u>30</u>	<u>54</u>	<u>20</u>	<u>12</u>	<u>15</u>	<u>27</u>
3	<u>24</u>	<u>66</u>	<u>90</u>	<u>36</u>	<u>8</u>	<u>22</u>	<u>30</u>
4	<u>24</u>	<u>120</u>	<u>144</u>	<u>54</u>	<u>6</u>	<u>30</u>	<u>36</u>

3. Draw the long run average cost curves for each of the following:

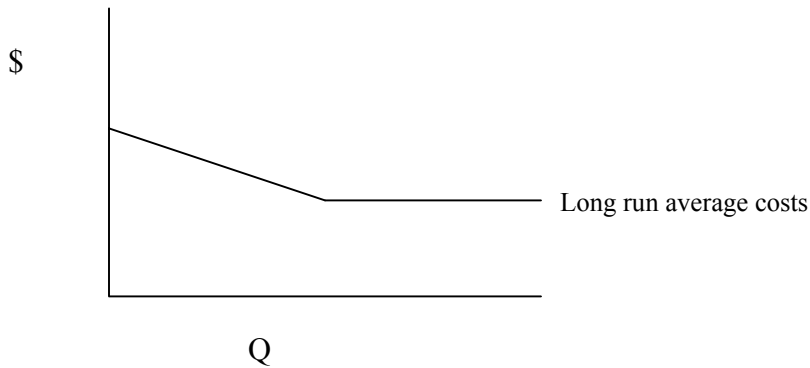
a) A firm with constant returns to scale



b) A firm with increasing returns to scale (a.k.a. “economies of scale”).



c) A firm with increasing returns to scale at lower levels of production, and constant returns to scale at higher levels of production.



4. A firm is currently producing and selling 100 brushes for \$2 each. It has average fixed costs of 50 cents and average variable costs of 75 cents at this production level.

a) Calculate the firm's total revenue, total fixed cost, total variable cost, and total profits at this production level.

b) Is this the short run or the long run for this firm? Explain your answer.

$$\text{Total revenue} = \text{price} \times \text{quantity} = \$2 \times 100 = \$200$$

$$\text{Total fixed costs} = \text{average fixed costs} \times \text{quantity} = .50 \times 100 = \$50$$

$$\text{Total variable cost} = \text{average variable cost} \times \text{quantity} = .75 \times 100 = \$75$$

$$\text{Total profit} = \text{total revenue} - \text{total cost} = 200 - (50 + 75) = \$75$$

*This is the short run, since fixed costs exist. (In the long run there are no fixed costs.)*