

0	\$500	\$0	\$500	---	---	---	---
100	\$500	\$700	\$1200	\$5.00	\$7.00	\$12.00	\$7.00
200	\$500	\$1300	_____	\$2.50	\$6.50	\$9.00	\$6.00
300	_____	_____	\$2300	_____	_____	_____	_____
400	_____	\$2500	_____	_____	_____	_____	_____
500	_____	_____	_____	_____	_____	_____	\$8.00
600	_____	_____	_____	_____	_____	\$8.00	_____
700	_____	_____	\$6000	_____	_____	_____	_____

Q - quantity of output

TFC - total fixed cost

TVC - total variable cost

TC - total cost = TFC + TVC

AFC - average fixed cost = TFC/Q

AVC - average variable cost = TVC/Q

ATC - average total cost = TC/Q

MC - marginal cost = $\Delta TC / \Delta Q = \Delta TVC / \Delta Q$

PLOT THE APPROPRIATE DATA FROM THE PRECEDING TABLE ON THE GRAPHS ON PAGES 3 AND 4 BEFORE ANSWERING THE QUESTIONS BELOW. GRAPH TFC, TVC, AND TC ON THE GRAPH ON PAGE 3 AND ATC, AVC, AFC AND MC ON THE GRAPH ON PAGE 4.

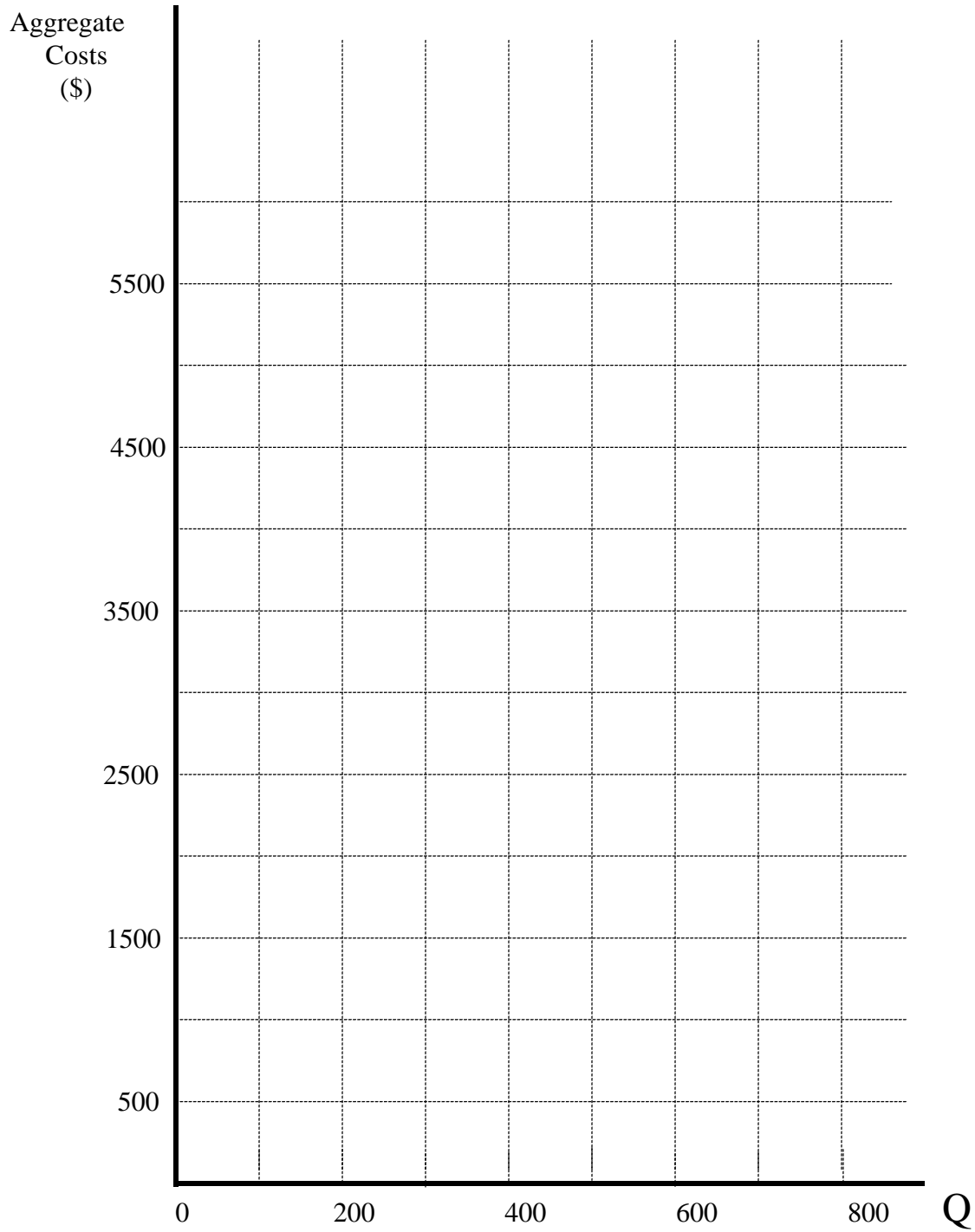
HINT: On page 4, graph the marginal cost curve first and then plot ATC and AVC so that they obey the average / marginal rules.

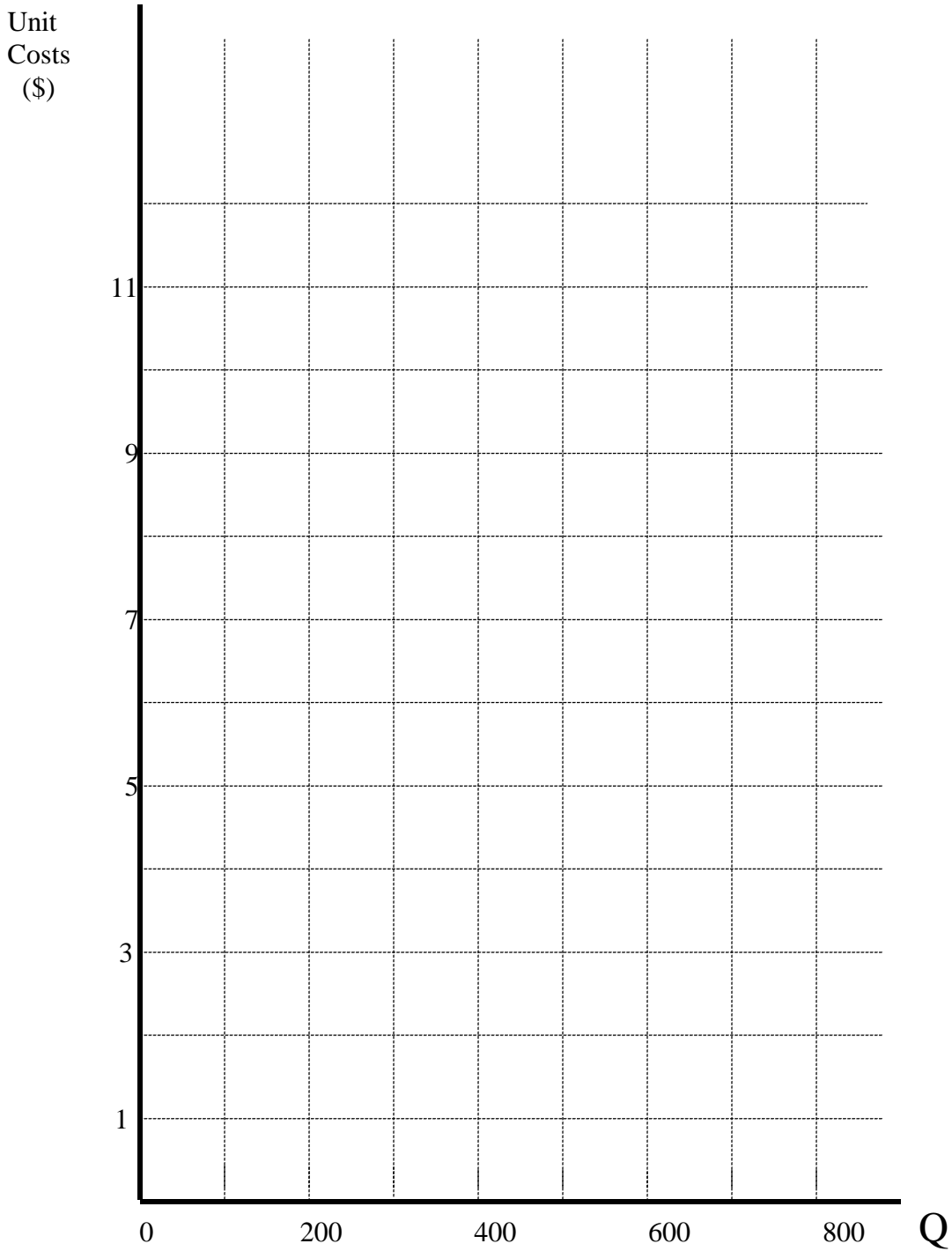
1. How is marginal cost represented on your graph on page 3?
2. On your graph on page 4, average total cost is at a minimum at an output level of approximately _____ units.
3. On your graph on page 4, average variable cost is at a minimum at an output level of approximately _____ units.

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(LAST)

(FIRST)





PRINT YOUR NAME _____
 (LAST) (FIRST)

SOCIAL SECURITY NUMBER _____ SECT _____

4. On your graph on page 4, what is the relation between marginal cost and average total cost when average total cost is at its minimum?

5. On your graph on page 4, what is the relation between marginal cost and average variable cost when average variable cost is at its minimum?

6. Explain why marginal cost always intersects average total cost and average variable cost at their minimum points.

7. On your graph on page 3, explain why the total cost curve eventually gets steeper.

8. On your graph on page 4, explain why the marginal cost curve eventually is upward sloping.

9. On your graph on page 4, what does the vertical distance between the average total cost curve and the average variable cost curve represent?

10. Explain why fixed cost has no influence on marginal cost.

Part III

The law of diminishing marginal returns is a frequently used term in economics. This law refers to the idea that the additional output created by equal increases in variable inputs (i.e. labor) will decrease. That is, output increases, but at a decreasing rate.

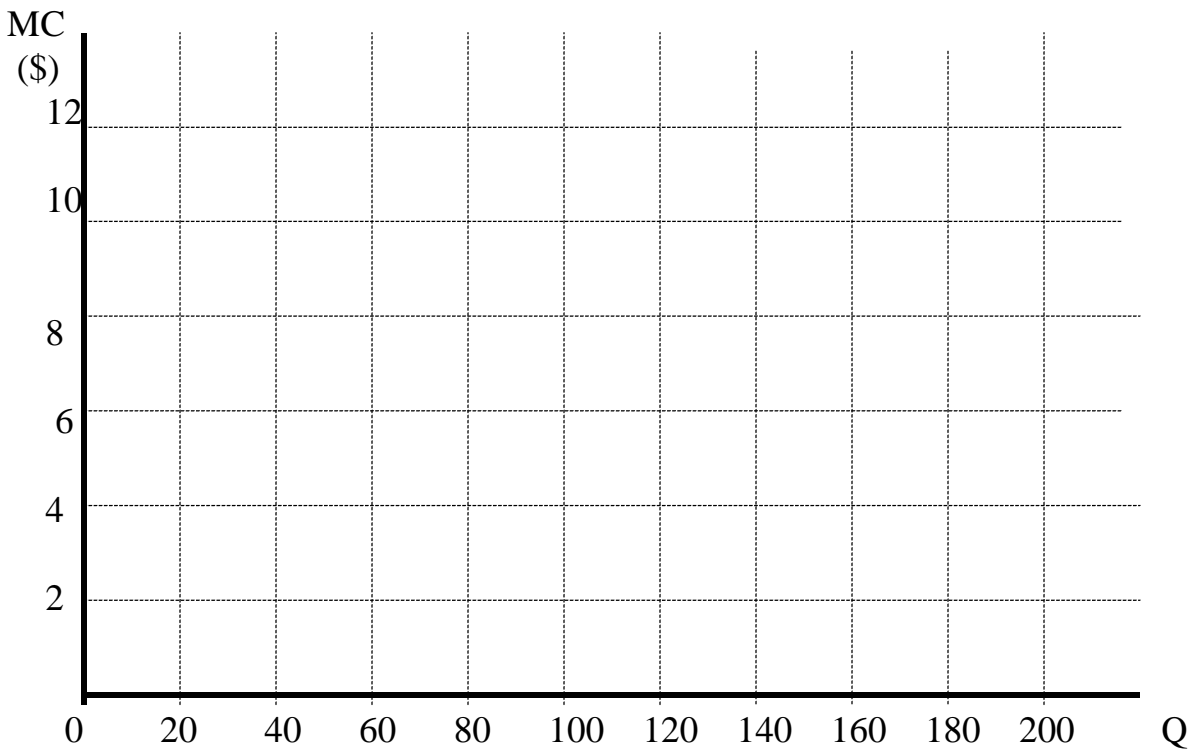
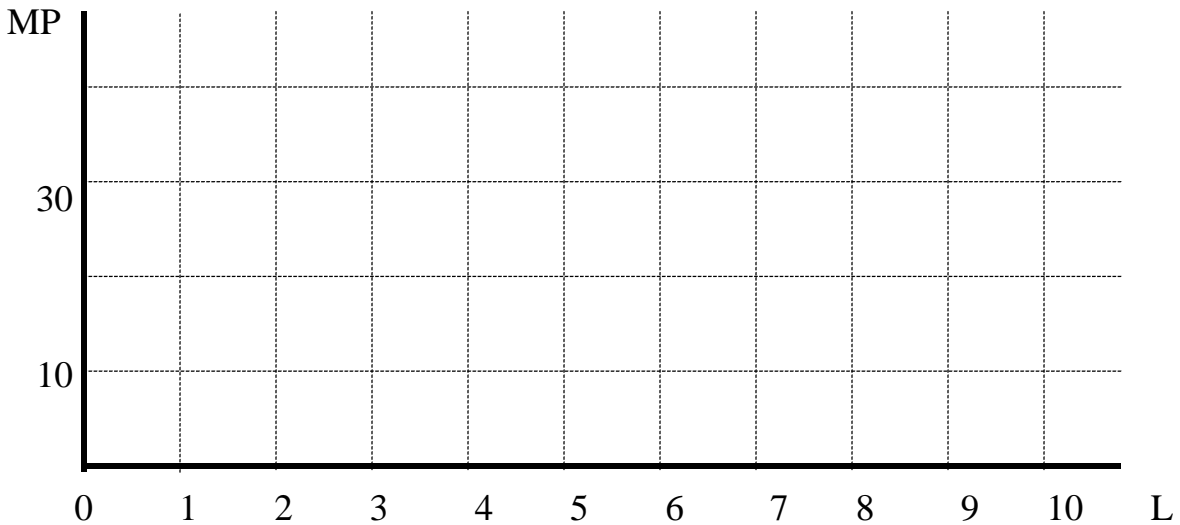
Adding an additional unit of a variable input or factor of production to already fixed factors of production might actually lead to increasing returns or constant returns for a while, but in almost all cases adding more and more of a variable factor of production to existing fixed factors of production eventually leads to decreasing marginal returns.

The law of diminishing marginal returns is directly related to the examples of increasing marginal cost just illustrated. If each unit of an input is equally productive and cost the firm an equal amount, the cost of an additional unit of output will increase when decreasing marginal product sets in. You can see this for yourself, by completing the table below.

Number of Workers (L)	Output (Q)	Total Cost (TC)	Marginal Product ($\Delta Q/\Delta L$)	Marginal Cost ($\Delta TC/\Delta Q$)
0	0	\$100	-----	-----
1	20	\$160	20	\$3.00
2	50	\$220	30	\$2.00
3	85	\$280	35	\$1.71
4	115	\$340	_____	\$2.00
5	140	\$400	25	\$2.40
6	160	\$460	_____	\$_____
7	175	\$520	_____	\$_____
8	185	\$580	_____	\$6.00
9	190	\$640	5	\$_____

Plot the marginal product data from this table on the top set of axes on page 7 and plot the marginal cost data on the bottom set of axis on page 7.

PRINT YOUR NAME _____
(LAST) (FIRST)



Even though the axes on the two graphs are different, a careful study of these two diagrams indicates that decreasing marginal product and increasing marginal cost are “mirror images” of each other. When marginal product is increasing (up to the third workers), marginal cost is decreasing (up to the 85th unit of output) and vice versa.

NOTES