

Quantity of labor employed	Total output	Marginal product of labor	Average product of labor	Total cost	Marginal cost	Average variable cost
0	0	—	—	\$	—	—
1	5	5	5	—	\$	\$
2	11	6	5.50	—	—	—
3	18	7	6	—	—	—
4	24	6	6	—	—	—
5	29	5	5.80	—	—	—
6	33	4	5.50	—	—	—
7	36	3	5.14	—	—	—
8	38	2	4.75	—	—	—
9	39	1	4.33	—	—	—
10	39	0	3.90	—	—	—

4. Assume that a firm has a plant of fixed size and that it can vary its output only by varying the amount of labor it employs. The table at the top of the page shows the relationships among the amount of labor employed, the output of the firm, the marginal product of labor, and the average product of labor.

a. Assume each unit of labor costs the firm \$10. Compute the total cost of labor for each quantity of labor the firm might employ, and enter these figures in the table.

b. Now determine the marginal cost of the firm's product as the firm increases its output. Divide the increase in total labor cost by the *increase* in total output to find the marginal cost. Enter these figures in the table.

c. When the marginal product of labor  
(1) increases, the marginal cost of the firm's product (increases, decreases) \_\_\_\_\_.

(2) decreases, the marginal cost of the firm's product \_\_\_\_\_.

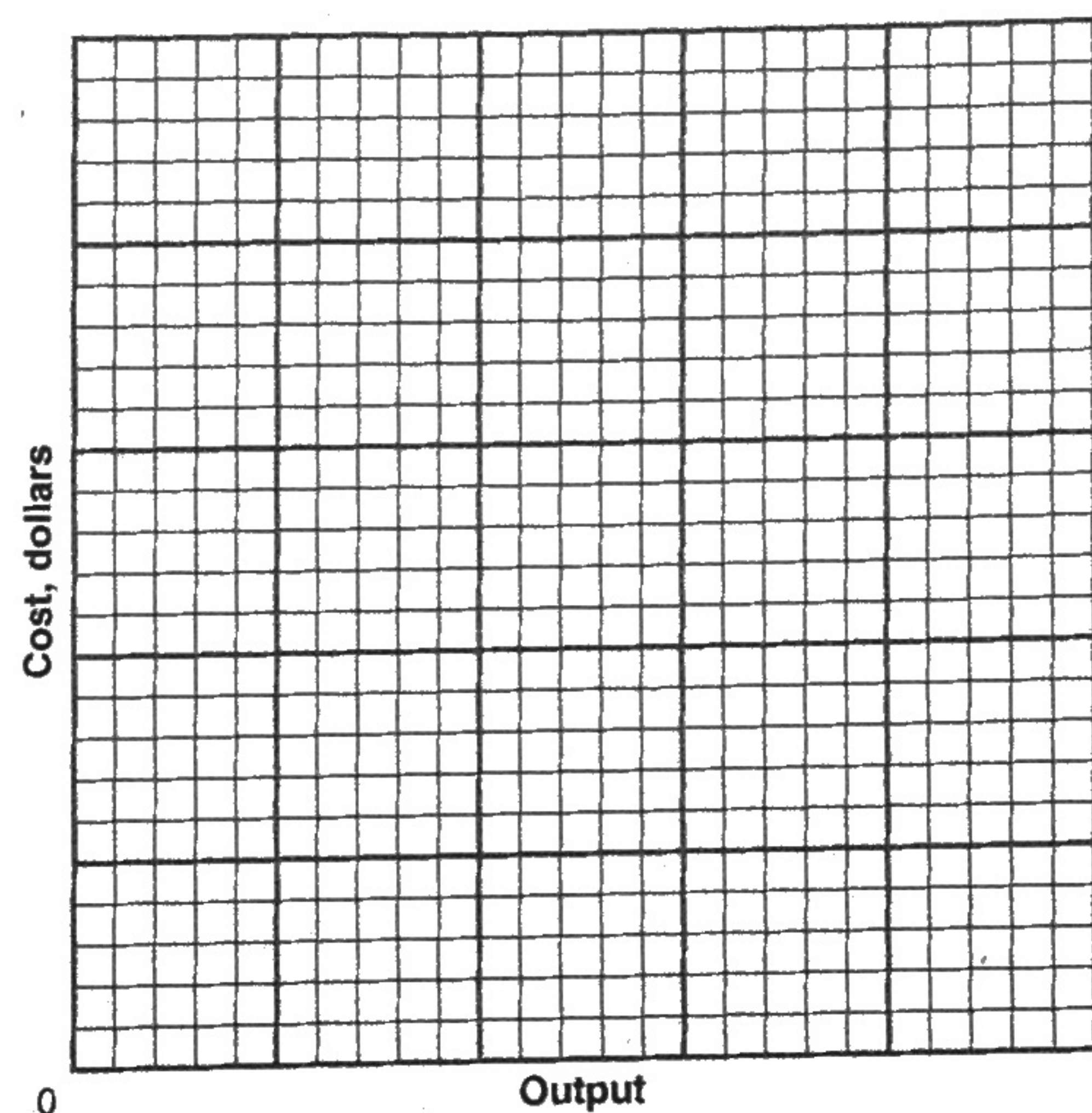
d. If labor is the only variable input, the total labor cost and total variable cost are equal. Find the average variable cost of the firm's product (by dividing the total labor cost by total output) and enter these figures in the table.

e. When the average product of labor  
(1) increases, the average variable cost (increases, decreases) \_\_\_\_\_.

(2) decreases, the average variable cost \_\_\_\_\_.

5. The law of diminishing returns causes a firm's average variable, average total, and marginal cost to decrease at first and then to increase as the output of the firm increases.

Sketch these three cost curves on the following graph in such a way that their proper relationship to each other is shown.



6. The table that follows is a schedule of a firm's fixed cost and variable cost.

a. Complete the table by computing total cost, average fixed cost, average total cost, and marginal cost.

b. On the graph at the top of the next page, plot and label fixed cost, variable cost, and total cost.

c. On the graph at the bottom of the next page, plot average fixed cost, average variable cost, average total cost, and marginal cost. Label the four curves.

Output	Total fixed cost	Total variable cost	Total cost	Average fixed cost	Average variable cost	Average total cost	Marginal cost
0	\$200	\$ 0	\$	\$	\$50.00	\$	\$
1	200	50	—	—	45.00	—	—
2	200	90	—	—	40.00	—	—
3	200	120	—	—	40.00	—	—
4	200	160	—	—	44.00	—	—
5	200	220	—	—	50.00	—	—
6	200	300	—	—	57.14	—	—
7	200	400	—	—	65.00	—	—
8	200	520	—	—	74.44	—	—
9	200	670	—	—	90.00	—	—
10	200	900	—	—	—	—	—