2. Martha has a fixed budget of $20, and she spends it all on two goods, X and Y. The price of X is $4 per unit, and the price of Y is $2 per unit. The table below shows the total benefit, measured in dollars, Martha receives from the consumption of each good.

Quantity of X	Total Benefit from X	Quantity of Y	Total Benefit from Y
0	$0	0	$0
1	$16	1	$10
2	$28	2	$18
3	$36	3	$24
4	$40	4	$28
5	$41	5	$30

(a) What is Martha's marginal benefit of the fifth unit of good X?

(b) Calculate the total consumer surplus if Martha consumes 5 units of X. Show your work.

(c) Martha is currently consuming 4 units of X and 2 units of Y. Use marginal analysis to explain why this combination is not optimal for Martha.

(d) What is Martha's optimal combination of goods X and Y?

(e) Indicate whether each of the following will cause the optimal quantity of good Y to increase, decrease, or stay the same.

(i) The price of good Y doubles.

(ii) Martha's income falls to $10 with no changes in prices.

(iii) Martha's income doubles, and the price of both goods double.

3. Camden's Cakery is one of many dessert cafés serving a local community. Each café produces a slightly differentiated product, there are no barriers to entry or exit, and the firm is in long-run equilibrium.

   (a) Draw a correctly labeled graph showing Camden's demand curve, marginal revenue curve, marginal cost curve, and long-run average total cost curve. Label Camden's profit-maximizing output Q_m and its price P_m.

   (b) On your graph in part (a), label the output at which total revenue is maximized Q_R.

   (c) Do firms in this market experience economies of scale, diseconomies of scale, or neither in long-run equilibrium? Explain.

STOP

END OF EXAM

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Question 2

7 points (1+1+1+1+3)

(a) 1 point:

- One point is earned for stating that the marginal benefit is $1.

(b) 1 point:

- One point is earned for correctly calculating the total consumer surplus from consuming 5 units of X.

$$CS = (\$16 - \$4) + (\$12 - \$4) + (\$8 - \$4) + (\$4 - \$4) + (\$1 - \$4) = \$21$$

OR

$$CS = \$41 - \$20 = \$21$$

(c) 1 point:

- One point is earned for explaining that this combination of X and Y is not optimal because the marginal benefit per dollar of good X (MB_x/P_x=\$4/\$4 =1) is less than the marginal benefit per dollar of good Y (MB_y/P_y=\$8/\$2=4). (This can also be stated as $MB_x/MB_y < P_x/P_y$.)

  ($MB_x/P_x = 1$) is not equal to ($MB_y/P_y = 4$) is acceptable.

  MB_x/P_x is less than MB_y/P_y is acceptable.

  MB_y/P_y is greater than MB_x/P_x is acceptable.

(d) 1 point:

- One point is earned for stating that Martha's optimal combination is 3 units of X and 4 units of Y.

(e) 3 points:

- One point is earned for stating that the optimal quantity of good Y will decrease.
- One point is earned for stating that the optimal quantity of good Y will decrease.
- One point is earned for stating that the optimal quantity of good Y will stay the same.