2020 Short - Set 1

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Michelle's Accounting Company.

Number of Bookkeepers	Total Product per Hour
1	8
2	20
3	40
4	55
5	65
6	70
7	65
8	55

(a) After which bookkeeper do diminishing marginal returns begin for Michelle's Accounting Company? Explain using numbers.

(b) Assume Michelle's Accounting Company sells its accounting services in a perfectly competitive market at a price of $20. Calculate the marginal revenue product of the sixth bookkeeper. Show your work.

(c) Michelle's Accounting Company hires bookkeepers in a perfectly competitive labor market for bookkeepers at a wage rate of $110 per hour, and the market price of services remains $20. How many bookkeepers will Michelle's Accounting Company hire to maximize its profit? Explain using marginal analysis.

(d) Assume bookkeepers and accounting software are substitutes in providing accounting services by all accounting firms in the market. If accounting software, a fixed input, becomes less expensive and Michelle's Accounting Company provides the same quantity of accounting services, will each of the following increase, decrease, or stay the same?
(i) The wage rate Michelle's Accounting Company will pay its bookkeepers. Explain.
(ii) The demand curve for bookkeepers for Michelle's Accounting Company. Explain.

1. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that diminishing marginal returns begin after the third worker and explains that the marginal product (MP) of the fourth worker (15) was less than the MP of the third worker (20).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the sixth worker as $100 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$20 \times 5 = \$100$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 5 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 5^{th} worker ($200) is greater than the marginal resource cost (MRC) or wage ($110), but the MRP of the 6^{th} worker ($100) is less than the MRC ($110).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the wage rate the firm will pay will decrease and explains that a decrease in the price of accounting software will result in a decrease in the demand for workers because accounting software and workers are substitutes in providing accounting services. A decrease in the demand for workers will decrease the market wage and therefore decrease the wage rate paid by the firm because the firm is a wage taker.

2020 Short - Set 1

· States that the demand curve for bookkeepers by Michelle's Accounting Company will stay the same in the short run and explains that the firm's demand curve for labor is the marginal revenue product of labor (MRP), which is the price of the service times the marginal product, and in the short run there is no change in the price of the service or the marginal product.

Or states that the demand curve for bookkeepers by Michelle's Accounting Company will decrease in the long run and explains that the firm's demand curve for labor is the marginal revenue product of labor (MRP) which is the price of the service times the marginal product, and a decrease in the price of an input will increase the supply of accounting services in the market, which will decrease the market price of accounting services, and therefore will decrease the marginal revenue product for every unit of labor.

2020 Short - Set 1

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Ahmal's Manufacturing Company.

Number of Machinists	Total Product per Hour
1	20
2	45
3	75
4	110
5	150
6	180
7	200
8	198

(a) Beginning with which machinist do diminishing marginal returns set in for Ahmal's Manufacturing Company? Explain using numbers.

(b) Assume Ahmal's Manufacturing Company sells its goods in a perfectly competitive market at a unit price of $3. Calculate the marginal revenue product of the third machinist. Show your work.

(c) Ahmal's Manufacturing Company hires machinists in a perfectly competitive labor market for machinists at a wage rate of $40 per hour, and the market price of services remains $3. How many machinists will Ahmal's Manufacturing Company hire to maximize its profit? Explain using marginal analysis.

(d) Assume there is a decrease in the productivity of all workers in the labor market for machinists. What will happen to each of the following in equilibrium?
(i) The number of workers hired in the labor market for machinists. Explain.
(ii) The wage rate Ahmal's Manufacturing Company will pay its machinists. Explain.

2. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that diminishing marginal returns begin with the sixth worker and explains that the marginal product (MP) of the sixth worker (30) is less than the MP of the fifth worker (40).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the third worker as $90 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$3 \times 30 = \$90$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 7 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 7th worker ($60) is greater than the marginal resource cost (MRC) or wage ($40), but the MRP of the 8th worker ($-\$6$) is less than the MRC ($40).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the number of workers hired in the labor market would decrease and explains that a decrease in the productivity of workers will decrease the demand for labor in the market for machinists.

· States that the wage rate Ahmal's Manufacturing Company will pay will decrease and explains that the decrease in the market demand for labor will decrease the market wage, which decreases the wage rate paid by the firm because the firm

is a wage taker.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Bob's Barber Shop.

Number of Barbers	Total Product per Hour
1	3
2	7
3	12
4	16
5	19
6	21
7	22
8	20

(a) After which barber do diminishing marginal returns begin for Bob's Barber Shop? Explain using numbers.

(b) Assume Bob's Barber Shop sells haircut services in a perfectly competitive market at a unit price of $9. Calculate the marginal revenue product of the sixth barber. Show your work.

(c) Bob's Barber Shop hires barbers in a perfectly competitive labor market for barbers at a wage rate of $25 per hour, and the market price of haircut services remains $9. How many barbers will Bob's Barber Shop hire to maximize its profit? Explain using marginal analysis.

(d) Assume there is an increase in the demand for haircut services in the market. What will happen to each of the following?
(i) The market wage rate. Explain.
(ii) The marginal revenue product curve for Bob's Barber Shop. Explain.

3. Respond to all parts of the question.

Part A

2020 Short - Set 1

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that diminishing marginal returns begin after the third worker and explains that the marginal product (MP) of the fourth worker (4) is less than the MP of the third worker (5).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the sixth worker as $18 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$9 \times 2 = \$18$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 5 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 5^{th} worker ($27) is greater than the marginal resource cost (MRC) or wage ($25), but the MRP of the 6^{th} worker ($18) is less than the MRC ($25).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the market wage will increase and explains that an increase in the market demand for haircut services will lead to an increase in demand for barbers because the demand for barbers is dependent on (or derived from) the demand for haircut services.

· States that the marginal revenue product curve for the firm will shift to the right and explains that the marginal revenue

product is the price of the service times the marginal product, so an increase in the demand for haircut services will increase the market price of haircut services and will therefore increase the marginal revenue product for every unit of labor.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Briana's Brick Shop.

Number of Brick Masons	Total Product per Hour
1	9
2	19
3	30
4	42
5	52
6	61
7	63
8	60

(a) After which brick mason do diminishing marginal returns begin for Briana's Brick Shop? Explain using numbers.

(b) Assume Briana's Brick Shop sells its bricks in a perfectly competitive market at a price of $6. Calculate the marginal revenue product of the seventh brick mason. Show your work.

(c) Briana's Brick Shop hires brick masons in a perfectly competitive labor market for brick masons at a wage rate of $48 per hour, and the market price of bricks remains $6. How many brick masons will Briana's Brick Shop hire to maximize its profit? Explain using marginal analysis.

(d) Assume brick masons and machines are substitutes in the production of bricks by all brick-making firms in the market. If machines, a fixed input, become more expensive and Briana's Brick Shop produces the same quantity of bricks, will each of the following increase, decrease, or stay the same?
(i) The wage rate Briana's Brick Shop will pay its brick masons. Explain.
(ii) The demand curve for brick masons for Briana's Brick Shop. Explain.

4. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that diminishing marginal returns begin after the fourth worker and explains that the marginal product (MP) of the fifth worker (10) was less than the MP of the fourth worker (12).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the seventh worker as $12 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$6 \times 2 = \$12$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 6 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 6th worker ($54) is greater than the marginal resource cost (MRC) or wage ($48), but the MRP of the 7th worker ($12) is less than the MRC ($48).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the wage rate the firm will pay will increase and explains that an increase in the price of machines will result in an increase in the demand for workers because machines and workers are substitutes in producing bricks. An increase in the demand for workers will increase the market wage and therefore increase the wage rate paid by the firm because the firm is a wage taker.

2020 Short - Set 1

· States that the demand curve for brick masons by Briana's Brick Shop will stay the same in the short run and explains that the firm's demand curve for labor is the marginal revenue product of labor (MRP), which is the price of the product times the marginal product, and in the short run there is no change in the price of the product or the marginal product.

Or states that the demand curve for brick masons by Briana's Brick Shop will increase in the long run and explains that the firm's demand curve for labor is the marginal revenue product of labor (MRP) which is the price of the product times the marginal product, and an increase in the price of an input will decrease the supply of bricks in the market, which will increase the market price of bricks, and therefore will increase the marginal revenue product for every unit of labor.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Camila's Convenience Store.

Number of Clerks	Total Product per Hour
1	5
2	13
3	23
4	35
5	50
6	62
7	72
8	76

(a) After which clerk do diminishing marginal returns begin for Camila's Convenience Store? Explain using numbers.

(b) Assume Camila's Convenience Store sells its retail goods in a perfectly competitive market at a price of $5. Calculate the marginal revenue product of the fifth clerk. Show your work.

(c) Camila's Convenience Store hires clerks in a perfectly competitive labor market for clerks at a market wage of $24 per hour, and the market price of services remains $5. How many clerks will Camila's Convenience Store hire to maximize its profit? Explain using marginal analysis.

(d) Assume the market price of retail goods decreases as a result of a decrease in the number of consumers and Camila's Convenience Store continues to operate. What will happen to each of the following?
(i) The marginal factor cost for Camila's Convenience Store. Explain.
(ii) The marginal revenue product curve for Camila's Convenience Store. Explain.

5. Respond to all parts of the question.

2020 Short - Set 1

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that diminishing marginal returns begin after the fifth worker and explains that the marginal product (MP) of the sixth worker (12) was less than the MP of the fifth worker (15).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the fifth worker as $75 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$5 \times 15 = \$75$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 7 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 7th worker ($50) is greater than the marginal resource cost (MRC) or wage ($24), but the MRP of the 8th worker ($20) is less than the MRC ($24).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the marginal factor cost for the firm will decrease and explains that a decrease in the price of retail goods will lead to a decrease in demand for workers in that market, which will decrease the market wage and therefore decrease the firm’s marginal factor cost because the firm is a wage taker.

2020 Short - Set 1

· States that the marginal revenue product curve for the firm will shift to the left and explains that the marginal revenue product is the price of the product times the marginal product, so a decrease in the market price of retail goods will decrease the marginal revenue product for every unit of labor.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Phyliss's Carpentry Contractors.

Number of Carpenters	Total Product per Hour
1	200
2	255
3	305
4	345
5	380
6	410
7	435
8	455

(a) Beginning with which carpenter do diminishing marginal returns set in for Phyliss's Carpentry Contractors? Explain using numbers.

(b) Assume Phyliss's Carpentry Contractors sells its carpentry services in a perfectly competitive market at a price of $2. Calculate the marginal revenue product of the fifth carpenter. Show your work.

(c) Phyliss's Carpentry Contractors hires carpenters in a perfectly competitive labor market for carpenters at a wage rate of $90 per hour, and the market price of services remains $2. How many carpenters will Phyliss's Carpentry Contractors hire to maximize its profit? Explain using marginal analysis.

(d) Assume carpenters must pay for a certification exam before they can work in this industry. If the cost of that exam decreases, what will happen to each of the following in equilibrium?
(i) The market wage rate. Explain.
(ii) The number of workers hired in the labor market. Explain.

6. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that diminishing marginal returns begin with the second worker and explains that the marginal product (MP) of the second worker (55) is less than the MP of the first worker (200).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the fifth worker as $70 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$2 \times 35 = \$70$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 3 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 3rd worker ($100) is greater than the marginal resource cost (MRC) or wage ($90), but the MRP of the 4th worker ($80) is less than the MRC ($90).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the market wage rate will decrease and explains that a decrease in the cost of the exam will lead to an increase in the supply of workers in that market.

· States that the number of workers hired in the labor market will increase and explains that the decrease in the wage rate resulting from the increase in the supply of workers in that market will lead to more workers hired given the downward-

sloping demand curve.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Chukwuma's Salon.

Number of Stylists	Total Product per Hour
1	6
2	13
3	21
4	30
5	40
6	47
7	50
8	51

(a) After which stylist do diminishing marginal returns begin for Chukwuma's Salon? Explain using numbers.

(b) Assume Chukwuma's Salon sells its hair styling services in a perfectly competitive market at a price of $6. Calculate the marginal revenue product of the third stylist. Show your work.

(c) Chukwuma's Salon hires stylists in a perfectly competitive labor market for stylists at a wage rate of $35 per hour, and the market price of services remains $6. How many stylists will Chukwuma's Salon hire to maximize its profit? Explain using marginal analysis.

(d) Assume the market price of hair styling services increases as a result of an increase in the number of customers. What will happen to each of the following?
(i) The marginal factor cost for Chukwuma's Salon. Explain.
(ii) The marginal revenue product curve for Chukwuma's Salon. Explain.

7. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that diminishing marginal returns begin after the fifth worker and explains that the marginal product (MP) of the sixth worker (7) was less than the MP of the fifth worker (10).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the third worker as $48 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$6 \times 8 = \$48$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 6 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 6th worker ($42) is greater than the marginal resource cost (MRC) or wage ($35), but the MRP of the 7th worker ($18) is less than the MRC ($35).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the marginal factor cost for the firm will increase and explains that an increase in the price of hair styling services will lead to an increase in demand for workers in that market, which will increase the market wage and therefore increase the firm's marginal factor cost because the firm is a wage taker.

· States that the marginal revenue product curve for the firm will shift to the right and explains that the marginal revenue

product is the price of the product times the marginal product, so an increase in the price of hair styling services will increase the marginal revenue product for every unit of labor.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Denice's Diner.

Number of Cooks	Total Product per Hour
1	6
2	13
3	22
4	30
5	36
6	40
7	42
8	41

(a) Beginning with which cook do diminishing marginal returns set in for Denice's Diner? Explain using numbers.

(b) Assume Denice's Diner sells its meals in a perfectly competitive market at a unit price of $8. Calculate the marginal revenue product of the sixth cook. Show your work.

(c) Denice's Diner hires cooks in a perfectly competitive labor market for cooks at a wage rate of $15 per hour, and the market price of meals remains $8. How many cooks will Denice's Diner hire to maximize its profit? Explain using marginal analysis.

(d) Assume there is an increase in the productivity of all workers in the labor market for cooks. What will happen to each of the following in equilibrium?
(i) The number of workers hired in the labor market for cooks. Explain.
(ii) The wage rate Denice's Diner will pay its cooks. Explain.

8. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that diminishing marginal returns begin with the fourth worker and explains that the marginal product (MP) of the fourth worker (8) was less than the MP of the third worker (9).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the sixth worker as $32 and shows the work.

$\text{MRP} = \text{P} \times \text{MP} = \$8 \times 4 = \$32$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 7 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 7th worker ($16) is greater than the marginal resource cost (MRC) or wage ($15), but the MRP of the 8th worker ($-\$8$) is less than the MRC ($15).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the number of workers hired in the labor market will increase and explains that an increase in the productivity of workers will increase the demand for labor in the market for cooks.

· States that the wage rate Denice's Diner will pay will increase and explains that the increase in the market demand for labor will increase the market wage, which increases the wage rate paid by the firm because the firm is a wage taker.

2020 Short - Set 1

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Esther's Travel Agency.

Number of Travel Agents	Total Product per Hour
1	22
2	55
3	85
4	110
5	130
6	140
7	145
8	135

(a) After which travel agent do diminishing marginal returns begin for Esther's Travel Agency? Explain using numbers.

(b) Assume Esther's Travel Agency sells its travel services in a perfectly competitive market at a unit price of $5. Calculate the marginal revenue product of the fourth travel agent. Show your work.

(c) Esther's Travel Agency hires travel agents in a perfectly competitive labor market for travel agents at a wage rate of $26 per hour, and the market price of travel services remains $5. How many travel agents will Esther's Travel Agency hire to maximize its profit? Explain using marginal analysis.

(d) Assume there is a decrease in the demand for travel services in the market and Esther's Travel Agency continues to operate. What will happen to each of the following?
(i) The market wage rate. Explain.
(ii) The marginal revenue product curve for Esther's Travel Agency. Explain.

9. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that diminishing marginal returns begin after the second worker and explains that the marginal product (MP) of the third worker (30) is less than the MP of the second worker (33).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the fourth worker as $125 and shows the work.

$$MRP = P \times MP = \$5 \times 25 = \$125$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 6 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 6^{th} worker ($50) is greater than the marginal resource cost (MRC) or wage ($26), but the MRP of the 7^{th} worker ($25) is less than the MRC ($26).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the market wage will decrease and explains that a decrease in the market demand for travel services will lead to a decrease in demand for travel agents because the demand for travel agents is dependent on (or derived from) the demand for travel services.

· States that the marginal revenue product curve for the firm will shift to the left and explains that the marginal revenue

product is the price of the service times the marginal product, so a decrease in the demand for travel services will decrease the price of travel services and will therefore decrease the marginal revenue product for every unit of labor.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Jose's Tax Office.

Number of Administrative Assistants	Total Product per Hour
1	40
2	90
3	150
4	180
5	200
6	215
7	225
8	230

(a) After which administrative assistant do diminishing marginal returns begin for Jose's Tax Office? Explain using numbers.

(b) Assume Jose's Tax Office sells its tax advisory services in a perfectly competitive market at a unit price of $4. Calculate the marginal revenue product of the fifth administrative assistant. Show your work.

(c) Jose's Tax Office hires administrative assistants in a perfectly competitive labor market for administrative assistants at a wage rate of $90 per hour, and the market price of services remains $4. How many administrative assistants will Jose's Tax Office hire to maximize its profit? Explain using marginal analysis.

(d) Assume administrative assistants and office software are substitutes in providing tax advisory services by all tax firms in the market. If office software, a fixed input, becomes more expensive and Jose's Tax Office provides the same quantity of tax advisory services, will each of the following increase, decrease, or stay the same?
(i) The wage rate Jose's Tax Office will pay its administrative assistants. Explain.
(ii) The demand curve for administrative assistants for Jose's Tax Office. Explain.

10. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that diminishing marginal returns begin after the third worker and explains that the marginal product (MP) of the fourth worker (30) was less than the MP of the third worker (60).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the fifth worker as $80 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$4 \times 20 = \$80$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 4 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 4^{th} worker ($120) is greater than the marginal resource cost (MRC) or wage ($90), but the MRP of the 5^{th} worker ($80) is less than the MRC ($90).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the wage rate the firm will pay will increase and explains that an increase in the price of office software will result in an increase in the demand for workers because office software and workers are substitutes in providing tax advisory services. An increase in the demand for workers will increase the market wage and therefore increase the wage rate paid by the firm because the firm is a wage taker.

2020 Short - Set 1

· States that the demand curve for administrative assistants by Jose's Tax Office will stay the same in the short run and explains that the firm's demand curve for labor is the marginal revenue product of labor (MRP), which is the price of the service times the marginal product, and in the short run there is no change in the price of the service or the marginal product.

Or states that the demand curve for administrative assistants by Jose's Tax Office will increase in the long run and explains that the firm's demand curve for labor is the marginal revenue product of labor (MRP) which is the price of the product times the marginal product, and an increase in the price of an input will decrease the supply of tax advisory services in the market, which will increase the market price of services, and therefore will increase the marginal revenue product for every unit of labor.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Josh's Consulting Firm.

Number of Consultants	Total Product per Hour
1	21
2	43
3	66
4	88
5	108
6	126
7	141
8	151

(a) After which consultant do diminishing marginal returns begin for Josh's Consulting Firm? Explain using numbers.

(b) Assume Josh's Consulting Firm sells its consulting services in a perfectly competitive market at a unit price of $2. Calculate the marginal revenue product of the fifth consultant. Show your work.

(c) Josh's Consulting Firm hires consultants in a perfectly competitive labor market for consultants at a wage rate of $41 per hour, and the market price of consulting services remains $2. How many consultants will Josh's Consulting Firm hire to maximize its profit? Explain using marginal analysis.

(d) Assume the market price of consulting services increases as a result of an increase in the number of consumers. What will happen to each of the following?
(i) The marginal factor cost for Josh's Consulting Firm. Explain.
(ii) The marginal revenue product curve for Josh's Consulting Firm. Explain.

2020 Short - Set 1

11. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that diminishing marginal returns begin after the third worker and explains that the marginal product (MP) of the fourth worker (22) was less than the MP of the third worker (23).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the fifth worker as $40 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$2 \times 20 = \$40$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 4 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 4^{th} worker ($44) is greater than the marginal resource cost (MRC) or wage ($41), but the MRP of the 5^{th} worker ($40) is less than the MRC ($41).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

2020 Short - Set 1

· States that the marginal factor cost for the firm will increase and explains that an increase in the price of consulting services will lead to an increase in demand for workers in that market, which will increase the market wage and therefore increase the firm's marginal factor cost because the firm is a wage taker.

· States that the marginal revenue product curve for the firm will shift to the right and explains that the marginal revenue product is the price of the product times the marginal product, so an increase in the price of consulting services will increase the marginal revenue product for every unit of labor.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Lakshmi's Law Office.

Number of Clerks	*Total Product per Hour*
1	*33*
2	*68*
3	95
4	120
5	140
6	155
7	165
8	160

(a) Beginning with which clerk do diminishing marginal returns set in for Lakshmi's Law Office? Explain using numbers.

(b) Assume Lakshmi's Law Office sells its legal services in a perfectly competitive market at a unit price of $4. Calculate the marginal revenue product of the sixth clerk. Show your work.

(c) Lakshmi's Law Office hires clerks in a perfectly competitive labor market for clerks at a wage of $130 per hour, and the market price of legal services remains $4. How many clerks will Lakshmi's Law Office hire to maximize its profit? Explain using marginal analysis.

(d) Assume there is a decrease in the productivity of all workers in the labor market for clerks. What will happen to each of the following in equilibrium?
(i) The number of workers hired in the labor market for clerks. Explain.
(ii) The wage rate Lakshmi's Law Office will pay its clerks. Explain.

12. Respond to all parts of the question.

Part A

2020 Short - Set 1

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that diminishing marginal returns begin with the third worker and explains that the marginal product (MP) of the third worker (27) is less than the MP of the second worker (35).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the sixth worker as $60 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$4 \times 15 = \$60$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 2 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 2nd worker ($140) is greater than the marginal resource cost (MRC) or wage ($130), but the MRP of the 3rd worker ($108) is less than the MRC ($130).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the number of workers hired in the labor market would decrease and explains that a decrease in the productivity of workers will decrease the demand for labor in the market for clerks.

· States that the wage rate Lakshmi's Law Office will pay will decrease and explains that the decrease in the market demand for labor will decrease the market wage, which decreases the wage rate paid by the firm because the firm is a

2020 Short - Set 1

wage taker.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Malikah's Fashion Clothing.

Number of Garment Workers	Total Product per Hour
1	4
2	10
3	18
4	28
5	36
6	42
7	46
8	48

(a) After which garment worker do diminishing marginal returns begin for Malikah's Fashion Clothing? Explain using numbers.

(b) Assume Malikah's Fashion Clothing sells its clothes in a perfectly competitive market at a price of $8. Calculate the marginal revenue product of the fifth garment worker. Show your work.

(c) Malikah's Fashion Clothing hires garment workers in a perfectly competitive labor market for garment workers at a wage rate of $30 per hour, and the market price of clothes remains $8. How many garment workers will Malikah's Fashion Clothing hire to maximize its profit? Explain using marginal analysis.

(d) Assume the market price of clothes decreases as a result of a decrease in the number of consumers and Malikah's Fashion Clothing continues to operate. What will happen to each of the following?
(i) The marginal factor cost for Malikah's Fashion Clothing. Explain.
(ii) The marginal revenue product curve for Malikah's Fashion Clothing. Explain.

13. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that diminishing marginal returns begin after the fourth worker and explains that the marginal product (MP) of the fifth worker (8) was less than the MP of the fourth worker (10).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the fifth worker as $64 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$8 \times 8 = \$64$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 7 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 7^{th} worker ($32) is greater than the marginal resource cost (MRC) or wage ($30), but the MRP of the 8^{th} worker ($16) is less than the MRC ($30).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the marginal factor cost for the firm will decrease and explains that a decrease in the price of clothes will lead to a decrease in demand for workers in that market, which will decrease the market wage and therefore decrease the firm's marginal factor cost because the firm is a wage taker.

· States that the marginal revenue product curve for the firm will shift to the left and explains that the marginal revenue

product is the price of the product times the marginal product, so a decrease in the market price of clothes will decrease the marginal revenue product for every unit of labor.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Mateo's Metalworks.

Number of Welders	Total Product per Hour
1	5
2	11
3	16
4	20
5	23
6	25
7	26
8	25

(a) Beginning with which welder do diminishing marginal returns set in for Mateo's Metalworks? Explain using numbers.

(b) Assume Mateo's Metalworks sells its welding services in a perfectly competitive market at a unit price of $10. Calculate the marginal revenue product of the seventh welder. Show your work.

(c) Mateo's Metalworks hires welders in a perfectly competitive labor market for welders at a wage rate of $35 per hour, and the market price of welding services remains $10. How many welders will Mateo's Metalworks hire to maximize its profit? Explain using marginal analysis.

(d) Assume there is an increase in the productivity of all workers in the labor market for welders. What will happen to each of the following in equilibrium?
(i) The number of workers hired in the labor market for welders. Explain.
(ii) The wage rate Mateo's Metalworks will pay its welders. Explain.

14. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that diminishing marginal returns begin with the third worker and explains that the marginal product (MP) of the 3rd worker (5) is less than the MP of the 2nd worker (6).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the seventh worker as $10 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$10 \times 1 = \$10$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 4 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 4th worker ($40) is greater than the marginal resource cost (MRC) or wage ($35), but the MRP of the 5th worker ($30) is less than the MRC ($35).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the number of workers hired in the labor market will increase and explains that an increase in the productivity of workers will increase the demand for labor in the market for welders.

· States that the wage rate Mateo's Metalworks will pay will increase and explains that the increase in the market demand for labor will increase the market wage, which increases the wage rate paid by the firm because the firm is a wage taker.

2020 Short - Set 1

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Avonni's Painting Company.

Number of Painters	Total Product per Hour
1	120
2	250
3	370
4	420
5	460
6	490
7	510
8	515

(a) Beginning with which painter do diminishing marginal returns set in for Avonni's Painting Company? Explain using numbers.

(b) Assume Avonni's Painting Company sells its painting services in a perfectly competitive market at a price of $3. Calculate the marginal revenue product of the second painter. Show your work.

(c) Avonni's Painting Company hires painters in a perfectly competitive labor market for painters at a wage rate of $140 per hour, and the market price of services remains $3. How many painters will Avonni's Painting Company hire to maximize its profit? Explain using marginal analysis.

(d) Assume painters must pay for a certification exam before they can work in this industry. If the cost of that exam increases, what will happen to each of the following in equilibrium?
(i) The market wage rate. Explain.
(ii) The number of workers hired in the labor market. Explain.

15. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that diminishing marginal returns begin with the third worker and explains that the marginal product (MP) of the third worker (120) is less than the MP of the second worker (130).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the second worker as $390 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$3 \times 130 = \$390$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 4 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 4^{th} worker ($150) is greater than the marginal resource cost (MRC) or wage ($140), but the MRP of the 5^{th} worker ($120) is less than the MRC ($140).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the market wage rate will increase and explains that an increase in the cost of the exam will lead to a decrease in the supply of workers in that market.

· States that the number of workers hired in the labor market will decrease and explains that the increase in the wage rate resulting from the decrease in the supply of workers in that market will lead to fewer workers hired given the downward-

2020 Short - Set 1

sloping demand curve.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Chloe's Plumbing Services.

Number of Plumbers	Total Product per Hour
1	8
2	16
3	26
4	37
5	50
6	60
7	68
8	74

(a) After which plumber do diminishing marginal returns begin for Chloe's Plumbing Services? Explain using numbers.

(b) Assume Chloe's Plumbing Services sells its plumbing services in a perfectly competitive market at a unit price of $15. Calculate the marginal revenue product of the third plumber. Show your work.

(c) Chloe's Plumbing Services hires plumbers in a perfectly competitive labor market for plumbers at a wage rate of $115 per hour, and the market price of plumbing services remains $15. How many plumbers will Chloe's Plumbing Services hire to maximize its profit? Explain using marginal analysis.

(d) Assume plumbers and plumbing equipment are substitutes in providing plumbing services by all plumbing firms in the market. If plumbing equipment, a fixed input, becomes less expensive and Chloe's Plumbing Services provides the same quantity of plumbing services, will each of the following increase, decrease, or stay the same?
(i) The wage rate Chloe's Plumbing Services will pay its plumbers. Explain.
(ii) The demand curve for plumbers for Chloe's Plumbing Services. Explain.

16. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that diminishing marginal returns begin after the fifth worker and explains that the marginal product (MP) of the sixth worker (10) was less than the MP of the fifth worker (13).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the third worker as $150 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$15 \times 10 = \$150$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 7 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 7th worker ($120) is greater than the marginal resource cost (MRC) or wage ($115), but the MRP of the 8th worker ($90) is less than the MRC ($115).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the wage rate the firm will pay will decrease and explains that a decrease in the price of plumbing equipment will result in a decrease in the demand for plumbers because plumbing equipment and workers are substitutes in providing plumbing services. A decrease in the demand for workers will decrease the market wage and therefore decrease the wage rate paid by the firm because the firm is a wage taker.

2020 Short - Set 1

· States that the demand curve for plumbers by Chloe's Plumbing Services will stay the same in the short run and explains that the firm's demand curve for labor is the marginal revenue product of labor (MRP), which is the price of the service times the marginal product, and in the short run there is no change in the price of the service or the marginal product.

Or states that the demand curve for plumbers by Chloe's Plumbing Services will decrease in the long run and explains that the firm's demand curve for labor is the marginal revenue product of labor (MRP) which is the price of the service times the marginal product, and a decrease in the price of an input will increase the supply of plumbing services in the market, which will decrease the market price of plumbing services, and therefore will decrease the marginal revenue product for every unit of labor.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Raydisha's Radiology Clinic.

Number of Radiologists	Total Product per Hour
1	30
2	58
3	80
4	99
5	112
6	122
7	125
8	123

(a) After which radiologist do diminishing marginal returns begin for Raydisha's Radiology Clinic? Explain using numbers.

(b) Assume Raydisha's Radiology Clinic sells its radiological services in a perfectly competitive market at a unit price of $10. Calculate the marginal revenue product of the seventh radiologist. Show your work.

(c) Raydisha's Radiology Clinic hires radiologists in a perfectly competitive labor market for radiologists at a wage rate of $120 per hour, and the market price of radiological services remains $10. How many radiologists will Raydisha's Radiology Clinic hire to maximize its profit? Explain using marginal analysis.

(d) Assume there is a decrease in the demand for radiological services in the market and Raydisha's Radiology Clinic continues to operate. What will happen to each of the following?
(i) The market wage rate. Explain.
(ii) The marginal revenue product curve for Raydisha's Radiology Clinic. Explain.

2020 Short - Set 1

17. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that diminishing marginal returns begin after the first worker and explains that the marginal product (MP) of the second worker (28) is less than the MP of the first worker (30).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the seventh worker as $30 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$10 \times 3 = \$30$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 5 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 5^{th} worker ($130) is greater than the marginal resource cost (MRC) or wage ($120), but the MRP of the 6^{th} worker ($100) is less than the MRC ($120).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

2020 Short - Set 1

· States that the market wage will decrease and explains that a decrease in the market demand for radiological services will lead to a decrease in demand for radiologists because the demand for radiologists is dependent on (or derived from) the demand for radiological services.

· States that the marginal revenue product curve for the firm will shift to the left and explains that the marginal revenue product is the price of the service times the marginal product, so a decrease in the demand for radiological services will decrease the price of radiological services and will therefore decrease the marginal revenue product for every unit of labor.

***Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly la*beled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.**

The table below shows the short-run production function for Zhizhi's Bakery.

Number of Bakers	Total Product per Hour
1	9
2	19
3	28
4	36
5	43
6	49
7	53
8	52

(a) After which baker do diminishing marginal returns begin for Zhizhi's Bakery? Explain using numbers.

(b) Assume Zhizhi's Bakery sells its baked goods in a perfectly competitive market at a price of $5 per unit. Calculate the marginal revenue product of the fifth baker. Show your work.

(c) Zhizhi's Bakery hires bakers in a perfectly competitive labor market for bakers at a wage rate of $36 per hour, and the market price of baked goods remains $5. How many bakers will Zhizhi's Bakery hire to maximize its profit? Explain using marginal analysis.

(d) Assume there is an increase in the demand for baked goods in the market. What will happen to each of the following?
(i) The market wage rate. Explain.
(ii) The marginal revenue product curve for Zhizhi's Bakery. Explain.

18. Respond to all parts of the question.

Part A

2020 Short - Set 1

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that diminishing marginal returns begin after the second worker and explains that the marginal product (MP) of the third worker (9) is less than the MP of the second worker (10).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the fifth worker as $35 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$5 \times 7 = \$35$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 4 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 4^{th} worker ($40) is greater than the marginal resource cost (MRC) or wage ($36), but the MRP of the 5^{th} worker ($35) is less than the MRC ($36).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the market wage will increase and explains that an increase in the market demand for baked goods will lead to an increase in demand for bakers because the demand for bakers is dependent on (or derived from) the demand for baked goods.

· States that the marginal revenue product curve for the firm will shift to the right and explains that the marginal revenue

product is the price of the product times the marginal product, so an increase in the demand for baked goods will increase the market price of baked goods and will therefore increase the marginal revenue product for every unit of labor.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the short-run production function for Todd's Trucking Company.

Number of Drivers	Total Product per Hour
1	8
2	18
3	30
4	50
5	60
6	65
7	67
8	65

(a) Beginning with which driver do diminishing marginal returns set in for Todd's Trucking Company? Explain using numbers.

(b) Assume Todd's Trucking Company sells its trucking services in a perfectly competitive market at a price of $6. Calculate the marginal revenue product of the third driver. Show your work.

(c) Todd's Trucking Company hires drivers in a perfectly competitive labor market for drivers at a wage rate of $40 per hour, and the market price of services remains $6. How many drivers will Todd's Trucking Company hire to maximize its profit? Explain using marginal analysis.

(d) Assume drivers must pay for a certification exam before they can work in this industry. If the cost of that exam decreases, what will happen to each of the following in equilibrium?
(i) The market wage rate. Explain.
(ii) The number of workers hired in the labor market. Explain.

19. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that diminishing marginal returns begin with the fifth worker and explains that the marginal product (MP) of the fifth worker (10) is less than the MP of the fourth worker (20).

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the marginal revenue product of the third worker as $72 and shows the work.

$$\text{MRP} = \text{P} \times \text{MP} = \$6 \times 12 = \$72$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that 5 workers will be hired to maximize its profit and explains that the marginal revenue product (MRP) of the 5^{th} worker ($60) is greater than the marginal resource cost (MRC) or wage ($40), but the MRP of the 6^{th} worker ($30) is less than the MRC ($40).

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the market wage rate will decrease and explains that a decrease in the cost of the exam will lead to an increase in the supply of workers in that market.

· States that the number of workers hired in the labor market will increase and explains that the decrease in the wage rate resulting from the increase in the supply of workers in that market will lead to more workers hired given the downward-

sloping demand curve.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the marginal benefit, in dollars, that Ahmet derives from consuming two goods, books and Good D.

Quantity of Books	Marginal Benefit of Books	Quantity of Good D	Marginal Benefit of Good D
1	$28	1	$32
2	$16	2	$16
3	$4	3	$8
4	$2	4	$4
5	$1	5	$2
6	$0	6	$1

Ahmet has a limited weekly income of $18, and he spends it all on books and Good D. Assume the price of each book is $4 and the price of Good D is $1 per unit.

(a) Calculate the total consumer surplus from books if Ahmet buys 5 books. Show your work.

(b) Given his weekly income, would Ahmet be able to buy 3 books and 2 units of Good D? Explain using numbers.

(c) Identify the quantity of books and the quantity of Good D that will maximize Ahmet's total benefit given his weekly income. Explain using marginal analysis.

(d) Assume books are is produced in a perfectly competitive market and that there is an increase in the number of buyers in the market for books.
(i) Would Ahmet's total consumer surplus from books if he buys 5 books increase, decrease, or stay the same compared to your answer in part (a) ? Explain.
(ii) Will the quantity of books that will maximize Ahmet's total benefit increase, decrease, or stay the same? Explain.

20. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response calculates the total consumer surplus as $31 and shows the work.

$$\text{Total Consumer Surplus} = \text{Total Benefit} - \text{Total Expenditures} = 51 - 20 = 31$$

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that yes, Ahmet would be able to buy 3 books and 2 units of Good D and explains that his total expenditures would be $14

$$(= 3 \times \$4 + 2 \times \$1)$$

, which is less than his weekly income of $18.

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response identifies that 3 books and 6 units of Good D will maximize Ahmet's total benefit given his weekly income of $18 and explains that for the last unit of each good consumed the ratio of the marginal benefit to the price of books (1) is equal to the ratio of the marginal benefit to the price of Good D (1), or

$$\frac{MB_{Book}}{Price_{Book}} = \frac{MB_{Good\ D}}{Price_{Good\ D}}$$

$$\frac{\$4}{\$4} = \frac{\$1}{\$1}$$

$$1 = 1$$

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1	2 ✓

The response does both of the following:

· States that Ahmet's total consumer surplus would decrease and explains that an increase in the number of consumers in the market for books would increase the demand for books, which would increase the price of books, and an increase in the price of books would increase the total cost of 5 books while the total benefit of 5 books remains the same.

· States that the quantity of books that will maximize Ahmet's total benefit will decrease and explains that there has been an increase in the price of books which decreases the marginal benefit per dollar spent that Ahmet gets from each additional book.

2020 Short - Set 1

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the total benefit, in dollars, that Andrew derives from consuming two goods, cheeseburgers and Good J.

Quantity of Cheeseburgers	Total Benefit of Cheeseburgers	Quantity of Good J	Total Benefit of Good J
0	$0	0	$0
1	*$40*	*1*	*$30*
2	*$70*	*2*	*$50*
3	*$90*	*3*	*$65*
4	*$100*	*4*	*$75*
5	*$105*	*5*	*$80*
6	*$105*	*6*	*$83*

Andrew has a limited weekly income of $65, and he spends it all on cheeseburgers and Good J. Assume the price of each cheeseburger is $10 and the price of Good J is $5 per unit.

(a) Calculate Andrew's consumer surplus from the second unit of Good J. Show your work.

(b) Identify the quantity of cheeseburgers and the quantity of Good J that will maximize Andrew's total benefit given his weekly income. Explain using marginal analysis.

(c) If Andrew's weekly income increases from $65 to $75, would Andrew be able to buy 5 cheeseburgers and 6 units of Good J? Explain using numbers.

(d) Suppose the price of Good J decreases by 10% and Andrew buys 12% more of Good J and 8% more of Good S. Based on this change, identify whether Good J and Good S are substitutes, complements, or not related. Explain using numbers.

(e) Suppose instead that cheeseburgers are produced in a perfectly competitive market and the price of beef, an input to the production of cheeseburgers, decreases. If cheeseburgers are a normal good, will the quantity of cheeseburgers that will maximize Andrew's total benefit increase, decrease, or stay the same? Explain.

21. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response calculates consumer surplus as $15 and shows the work.

$$\text{Consumer Surplus} = \text{Marginal Benefit} - \text{Price} = \$20 - 5 = \$15$$

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response identifies that 4 cheeseburgers and 5 units of Good J will maximize Andrew's total benefit given his weekly income of $65 and explains that for the last unit of each good consumed the ratio of the marginal benefit to the price of cheeseburgers (1) is equal to the ratio of the marginal benefit to the price of Good J (1), or

$\frac{MB_{Frisbees}}{Price_{Frisbees}} = \frac{MB_{Good\ J}}{Price_{Good\ J}}$

$\frac{\$10}{\$10} = \frac{\$5}{\$5}$

$1 = 1$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that no, , Andrew would not be able to buy 5 cheeseburgers and 6 units of Good J and explains that his total expenditures would be $80 ($= \$10 \times 5 + \$5 \times 6$), which is greater than his weekly income of $75.

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response identifies that Good J and Good S are complements and explains that the cross-price elasticity of demand is

2020 Short - Set 1

negative because a 10% decrease in the price of Good J led to an 8% increase in the demand for Good S.

Part E

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that the quantity of cheeseburgers that will maximize Andrew's total benefit will increase and explains that a decrease in the price of an input to production will increase the supply of cheeseburgers, which will decrease the price of cheeseburgers and increase the marginal benefit per dollar spent for each additional unit consumed.

2020 Short - Set 1

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the total benefit, in dollars, that Courtney derives from consuming two goods, Good F and candy bars.

Quantity of Good F	Total Benefit of Good F	Quantity of Candy Bars	Total Benefit of Candy Bars
0	$0	0	$0
1	$40	1	$80
2	$70	2	$120
3	$90	*3*	*$140*
4	*$100*	*4*	*$152*
5	*$103*	*5*	*$156*
6	*$105*	*6*	*$156*

Courtney has a limited weekly income of $20, and she spends it all on Good F and candy bars. Assume the price of Good F is $2 per unit and the price of a candy bar is $4.

(a) Identify the quantity of Good F and the quantity of candy bars that will maximize Courtney's total benefit given her weekly income. Explain using marginal analysis.

(b) Calculate Courtney's consumer surplus from the fourth candy bar. Show your work.

(c) If Courtney's weekly income decreases from $20 to $18, would Courtney be able to buy 5 units of Good F and 2 candy bars? Explain using numbers.

(d) Suppose that candy bars are produced in a perfectly competitive market and the price of sugar, an input to the production of candy bars, increases. If candy bars are a normal good, will the quantity of candy bars that will maximize Courtney's total benefit increase, decrease, or stay the same? Explain.

(e) Suppose instead that the price of Good F increases by 9% and Courtney buys 6% less of Good F and 3% less of Good W. Based on this change, identify whether Good F and Good W are substitutes, complements, or not related. Explain using numbers.

22. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response identifies that 4 units of Good F and 3 candy bars will maximize Courtney's total benefit given her weekly income of $20 and explains that for the last unit of each good consumed the ratio of the marginal benefit to the price of Good F (5) is equal to the ratio of the marginal benefit to the price of candy bars (5), or

$$\frac{MB_{Good\ F}}{Price_{Good\ F}} = \frac{MB_{Candy\ Bars}}{Price_{Candy\ Bars}}$$

$$\frac{\$10}{\$2} = \frac{\$20}{\$4}$$

$$5 = 5$$

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates consumer surplus as $8 and shows the work.

$$\text{Consumer Surplus} = \text{Marginal Benefit} - \text{Price} = \ \$12 - \$4 = \$8$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that yes, Courtney would be able to buy 5 units of Good F and 2 candy bars and explains that her total expenditures would be $18 $(= \$2 \times 5 + \$4 \times 2)$, which is equal to her weekly income of $18.

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that the quantity of candy bars that will maximize Courtney's total benefit will decrease and explains

2020 Short - Set 1

that an increase in the price of an input to the production of candy bars would decrease the supply of candy bars, which would increase the price of candy bars and decrease the marginal benefit per dollar spent for each additional unit consumed.

Part E

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response identifies Good F and Good W as complements and explains that the cross-price elasticity of demand is negative because a 9% increase in the price of Good F led to a 3% decrease in the demand for Good W.

2020 Short - Set 1

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

*The table below shows the marg*inal benefit, in dollars, that Kareem derives from consuming two goods, Good X and cereal.

Quantity of Good X	Marginal Benefit of Good X	Quantity of Cereal	Marginal Benefit of Cereal
1	$18	1	$32
2	$16	2	$28
3	$12	3	$24
4	$6	4	$20
5	$2	5	$16
6	$0	6	$12

Kareem has a limited weekly income of $18, and he spends it all on Good X and cereal. Assume the price of Good X is $2 per unit and the price of cereal is $4 per unit.

(a) Given his weekly income, would Kareem be able to buy 3 units of Good X and 5 units of cereal? Explain using numbers.

(b) Calculate the total consumer surplus from Good X if Kareem consumes 4 units of Good X. Show your work.

(c) Identify the quantity of Good X and the quantity of cereal that will maximize Kareem's total benefit given his weekly income. Explain using marginal analysis.

(d) Assume Good X is produced in a perfectly competitive market and that there is a decrease in the number of consumers in the market for Good X.
(i) Will the quantity of Good X that will maximize Kareem's total benefit increase, decrease, or stay the same? Explain.
(ii) Would Kareem's total consumer surplus from Good X if he consumes 4 units of Good X increase, decrease, or stay the same compared to your answer in part (b) ? Explain.

23. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that no, Kareem would not be able to buy 3 units of Good X and 5 units of cereal and explains that his total expenditures would be $26

$$(= \$2 \times 3 + \$4 \times 5)$$

, which is greater than his weekly income of $18.

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the total consumer surplus as $44 and shows the work.

$$\text{Total Consumer Surplus} = \text{Total Benefit} - \text{Total Expenditures} = \$52 - \$8 = \$44$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response identifies 3 units of Good X and 3 units of cereal will maximize Kareem's total benefit given his weekly income of $18 and explains that for the last unit of each good consumed the ratio of the marginal benefit to the price of Good X (6) is equal to the ratio of the marginal benefit to the price of cereal (6), or

$$\frac{MB_{Good\ X}}{Price_{Good\ X}} = \frac{MB_{Cereal}}{Price_{Cereal}}$$

$$\frac{\$12}{\$2} = \frac{\$24}{\$4}$$

$$6 = 6$$

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1	2 ✓

The response does both of the following:

· States that the quantity of Good X that will maximize Kareem's total benefit will increase and explains that a decrease in the number of consumers in the market for Good X will decrease the demand for Good X, which will decrease the price of Good X and increase the marginal benefit per dollar spent that Kareem gets from each additional unit of the good.

· States that Kareem's total consumer surplus would increase and explains that a decrease in the price of Good X would decrease the total cost of consuming 4 units of Good X while the total benefit of consuming 4 units of cereal remains the same.

2020 Short - Set 1

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the total benefit, in dollars, that Maria derives from consuming two goods, bandanas and Good G.

Quantity of Bandanas	Total Benefit of Bandanas	Quantity of Good G	Total Benefit of Good G
0	$0	0	$0
1	$10	1	$38
2	$17	2	$70
3	$21	3	$96
4	$24	4	$116
5	$26	5	*$130*
6	*$26*	*6*	*$138*

Maria has a limited weekly income of $9, and she spends it all on bandanas and Good G. Assume the price of each bandana is $1 and the price of Good G is $2 per unit.

(a) Calculate Maria's consumer surplus from the fifth unit of Good G. Show your work.

(b) Identify the quantity of bandanas and the quantity of Good G that will maximize Maria's total benefit given her weekly income. Explain using marginal analysis.

(c) If Maria's weekly income increases from $9 to $12, would Maria be able to buy 3 bandanas and 4 units of Good G? Explain using numbers.

(d) Suppose the price of Good G decreases by 5% and Maria buys 2% more of Good G and 4% more of Good R. Based on this change, identify whether Good G and Good R are substitutes, complements, or not related. Explain using numbers.

(e) Suppose instead that bandanas are produced in a perfectly competitive market and the price of the fabric used to make bandanas decreases. If bandanas are a normal good, will the quantity of bandanas that will maximize Maria's total benefit increase, decrease, or stay the same? Explain.

24. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response calculates consumer surplus as $12 and shows the work.

$$\text{Consumer Surplus} = \text{Marginal Benefit} - \text{Price} = \ \$14 - \$2 = \$12$$

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response identifies that that 1 bandana and 4 units of Good G will maximize Maria's total benefit given her weekly income of $9 and explains that for the last unit of each good consumed the ratio of the marginal benefit to the price of Good G (10) is equal to the ratio of the marginal benefit to the price of bandanas (10), or

$\frac{MB_{Bandana}}{Price_{Bandana}} = \frac{MB_{Good\ G}}{Price_{Good\ G}}$

$\frac{\$10}{\$1} = \frac{\$20}{\$2}$

$10 = 10$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that yes, Maria would be able to buy 3 bandanas and 4 units of Good G and explains that her total expenditures would be $11

$$(= \$3 \times 1 + \$2 \times 4)$$

, which is less than her weekly income of $12.

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response identifies Good G and Good R as complements and explains that the cross-price elasticity of demand is negative because a 5% decrease in the price of Good G led to a 4% increase in the demand for Good R.

Part E

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that the quantity of bandanas that will maximize Maria's total benefit will increase and explains that a decrease in the price of an input to production will increase the supply of bandanas, which will decrease the price of bandanas and increase the marginal benefit per dollar spent for each additional unit consumed.

2020 Short - Set 1

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the marginal benefit, in dollars, that Patrick derives from consuming two goods, apples and Good B.

Quantity of Apples	Marginal Benefit of Apples	Quantity of Good B	Marginal Benefit of Good B
1	$14	1	$36
2	$6	2	$28
3	$4	3	$20
4	$3	4	$12
5	$1	5	$2
6	$0	6	$0

Patrick has a limited weekly income of $30, and he spends it all on apples and Good B. Assume the price of each apple is $2 and the price of Good B is $4 per unit.

(a) Calculate the total consumer surplus from Good B if Patrick consumes 2 units of Good B. Show your work.

(b) Given his weekly income, would Patrick be able to buy 2 apples and 3 units of Good B? Explain using numbers.

(c) Identify the quantity of apples and the quantity of Good B that will maximize Patrick's total benefit given his weekly income. Explain using marginal analysis.

(d) Assume Good B is produced in a perfectly competitive market and that there is a decrease in the number of consumers in the market for Good B.
(i) Would Patrick's total consumer surplus from Good B if he consumes 2 units of Good B increase, decrease, or stay the same compared to your answer in part (a) ? Explain.
(ii) Will the quantity of Good B that will maximize Patrick's total benefit increase, decrease, or stay the same? Explain.

25. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

2020 Short - Set 1

The response calculates the total consumer surplus as $56 and shows the work.

$$\text{Total Consumer Surplus} = \text{Total Benefit} - \text{Total Expenditures} = \$64 - \$8 = \$56$$

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that yes, Patrick would be able to buy 2 apples and 3 units of Good B and explains that his total expenditures would be $16

$$(= \$2 \times 2 \times \$4 \times 3)$$

, which is less than his weekly income of $30 .

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response identifies that 5 apples and 5 units of Good B will maximize Patrick's total benefit given his weekly income of $30 and explains that for the last unit of each good consumed the ratio of the marginal benefit to the price of apples (0.5) is equal to the ratio of the marginal benefit to the price of Good B (0.5), or

$$\frac{MB_{Apples}}{Price_{Apples}} > \frac{MB_{Good\ B}}{Price_{Good\ B}}$$

$$\frac{\$1}{\$2} = \frac{\$2}{\$4}$$

$$0.5 = 0.5$$

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

2020 Short - Set 1

· States that Patrick's total consumer surplus would increase and explains that a decrease in the number of consumers in the market for Good B would decrease the demand for Good B, which would decrease the price of Good B, and a decrease in the price of Good B would decrease the total cost of consuming 2 units of Good B while the total benefit of consuming 2 units of Good B remains the same.

· States that the quantity of Good B that will maximize Patrick's total benefit will increase and explains that there has been a decrease in the price of Good B and an increase in the marginal benefit per dollar spent that Patrick gets from each additional unit of the good.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the total benefit, in dollars, that Polina derives from consuming two goods, sandwiches and Good E.

Quantity of Sandwiches	Total Benefit of Sandwiches	Quantity of Good E	Total Benefit of Good E
0	$0	0	$0
1	$120	1	$120
2	$210	2	$180
3	$270	3	$210
4	$300	4	$222
5	$310	5	$225
6	$315	6	$225

Polina has a limited weekly income of $24, and she spends it all on sandwiches and Good E. Assume the price of each sandwich is $3 and the price of Good E is $6 per unit.

(a) Calculate Polina's consumer surplus from the third unit of Good E. Show your work.

(b) Identify the quantity of Good E and the quantity of sandwiches that will maximize Polina's total benefit given her weekly income. Explain using marginal analysis.

(c) If Polina's weekly income increases from $24 to $28, will Polina be able to buy 4 sandwiches and 3 units of Good E? Explain using numbers.

(d) Suppose the price of Good E increases by 8% and Polina buys 2% less of Good E and 4% more of Good Y. Based on this change, identify whether Good E and Good Y are substitutes, complements, or not related. Explain using numbers.

(e) Suppose instead that sandwiches are produced in a perfectly competitive market and the price of bread, an input to the production of sandwiches, decreases. If sandwiches are a normal good, will the quantity of sandwiches that will maximize Polina's total benefit increase, decrease, or stay the same? Explain.

2020 Short - Set 1

26. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates consumer surplus as $24 and shows the work.

$$\text{Consumer Surplus} = \text{Marginal Benefit} - \text{Price} = \ \$30 - 6 = \$24$$

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response identifies that 4 sandwiches and 2 units of Good E will maximize Polina's total benefit given her weekly income of $24 and explains that for the last unit of each good consumed the ratio of the marginal benefit to the price of Good E (10) is equal to the ratio of the marginal benefit to the price of sandwiches (10), or

$$\frac{MB_{Good\ E}}{Price_{Good\ E}} = \frac{MB_{Sandwich}}{Price_{Sandwich}}$$

$$\frac{\$30}{\$3} = \frac{\$60}{\$6}$$

$$10 = 10$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that no, Polina would not be able to buy 4 sandwiches and 3 units of Good E and explains that her total expenditures would be $30

$$(= \$3 \times 4 + \$6 \times 3)$$

, which is greater than her weekly income of $28.

Part D

2020 Short - Set 1

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response identifies that Good E and Good Y are substitutes and explains that the cross-price elasticity of demand is positive because an 8% increase in the price of Good E led to a 4% increase in the demand for Good Y.

Part E

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that the quantity of sandwiches that will maximize Polina's total benefit will increase and explains that a decrease in the price of an input to the production of sandwiches would increase the supply of sandwiches, which would decrease the price of sandwiches and increase the marginal benefit per dollar spent for each additional unit consumed.

2020 Short - Set 1

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the marginal benefit, in dollars, that Sam derives from consuming two goods, Good C and candles.

Quantity of Good C	*Marginal Benefit of Good C*	*Quantity of Candles*	*Marginal Benefit of Candles*
1	*$20*	1	$30
2	$16	2	$27
3	$12	3	$24
4	$8	4	$21
5	$6	5	$18
6	$4	6	$12

Sam has a limited weekly income of $21, and he spends it all on Good C and candles. Assume the price of Good C is $2 per unit and the price of each candle is $3.

(a) Given his weekly income, would Sam be able to buy 3 units of Good C and 3 candles? Explain using numbers.

(b) Calculate the total consumer surplus from Good C if Sam consumes 6 units of Good C. Show your work.

(c) Identify the quantity of Good C and the quantity of candles that will maximize Sam's total benefit given his weekly income. Explain using marginal analysis.

(d) Assume Good C is produced in a perfectly competitive market and that there is a decrease in the number of consumers in the market for Good C.
(i) Will the quantity of Good C that will maximize Sam's total benefit increase, decrease, or stay the same? Explain.
(ii) Would Sam's total consumer surplus from Good C if he consumes 6 units of Good C increase, decrease, or stay the same compared to your answer in part (b) ? Explain.

27. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that yes, Sam would be able to buy 3 units of Good C and 3 candles and explains that his total

2020 Short - Set 1

expenditures would be $\$15 (= \$2 \times 3 + \$3 \times 3)$, which is less than his weekly income of $21.

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the total consumer surplus as $54 and shows the work.

$$\text{Total Consumer Surplus} = \text{Total Benefit} - \text{Total Expenditures}$$
$$= \$66 - \$12 = \$54$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response identifies that 3 units of Good C and 5 candles will maximize Sam's total benefit given his weekly income of $21 and explains that for the last unit of each good consumed the ratio of the marginal benefit to the price of Good C (6) is equal to the ratio of the marginal benefit to the price of candles (6), or

$$\frac{MB_{Good\ C}}{Price_{Good\ C}} = \frac{MB_{Candles}}{Price_{Candles}}$$

$$\frac{\$12}{\$2} = \frac{\$18}{\$3}$$

$$6 = 6$$

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1	2 ✓

The response does both of the following:

· States that the quantity of Good C that will maximize Sam's total benefit will increase and explains that a decrease in the number of consumers in the market for Good C will decrease the demand for Good C, which will decrease the price of Good C and increase the marginal benefit per dollar spent that Sam gets from each additional unit of the good.

· States that Sam's total consumer surplus would increase and explains that a decrease in the price of Good C would decrease the total cost of consuming 6 units of Good C while the total benefit of consuming 6 units of candles remains the

same.

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the marginal benefit, in dollars, that Yanick derives from consuming two goods, Good A and shirts.

Quantity of Good A	Marginal Benefit of Good A	Quantity of Shirts	Marginal Benefit of Shirts
1	$64	1	$48
2	$40	2	$40
3	$24	3	$32
4	$12	4	$24
5	$4	5	$16
6	$0	6	$8

Yanick has a limited weekly income of $10, and he spends it all on Good A and shirts. Assume the price of Good A is $2 per unit and the price of each shirt is $4.

(a) Given his weekly income, would Yanick be able to buy 2 units of Good A and 2 shirts? Explain using numbers.

(b) Calculate the total consumer surplus from Good A if Yanick consumes 3 units of Good A. Show your work.

(c) Identify the quantity of Good A and the quantity of shirts that will maximize Yanick's total benefit given his weekly income. Explain using marginal analysis.

(d) Assume Good A is produced in a perfectly competitive market and that there is an increase in the number of consumers in the market for Good A.
(i) Will the quantity of Good A that will maximize Yanick's total benefit increase, decrease, or stay the same? Explain.
(ii) Would Yanick's total consumer surplus from Good A if he consumes 3 units of Good A increase, decrease, or stay the same compared to your answer in part (b) ? Explain.

28. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response states that no Yanick would not be able to consume 2 units of Good A and 2 shirts and explains that his total expenditures would be $12

$$(= \$2 \times 2 + \$4 \times 2)$$

, which is greater than his weekly income of $10.

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates the total consumer surplus as $128 and shows the work.

$$\text{Total Consumer Surplus} = \text{Total Benefit} - \text{Total Expenditures}$$
$$= \$128 - \$6 = \$122$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response identifies that 3 units of Good A and 1 shirt will maximize Yanick's total benefit given his weekly income of $10 and explains that for the last unit of each good consumed the ratio of the marginal benefit to the price of Good A (12) is equal to the ratio of the marginal benefit to the price of shirts (12), or

$$\frac{MB_{Good\ A}}{Price_{Good\ A}} = \frac{MB_{Shirts}}{Price_{Shirts}}$$

$$\frac{\$24}{\$2} = \frac{\$48}{\$4}$$

$$12 = 12$$

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1	2 ✓

The response does both of the following:

· States that the quantity of Good A that will maximize Yanick's total benefit will decrease and explains that an increase in the number of consumers in the market for Good A will increase the demand for Good A, which will increase the price of Good A and decrease the marginal benefit per dollar spent that Yanick gets from each additional unit of the good.

· States that Yanick's total consumer surplus would decrease and explains that an increase in the price of Good A would increase the total cost of consuming 3 units of Good A while the total benefit of consuming 3 units of Good A remains the same.

2020 Short - Set 1

Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. If the question prompts you to "Calculate," you must show how you arrived at your final answer.

The table below shows the total benefit, in dollars, that Zeynep derives from consuming two goods, Good H and slices of pizza.

Quantity of Good H	Total Benefit of Good H	Slices of Pizza	Total Benefit of Pizza
0	$0	0	$0
1	*$100*	*1*	*$15*
2	*$148*	*2*	*$27*
3	*$172*	*3*	*$36*
4	*$184*	*4*	*$42*
5	*$190*	*5*	*$45*
6	*$192*	*6*	*$45*

Zeynep has a limited weekly income of $12, and she spends it all on Good H and slices of pizza. Assume the price of Good H is $2 per unit and the price of a slice of pizza is $1.

(a) Identify the quantity of Good H and slices of pizza that will maximize Zeynep's total benefit given her weekly income. Explain using marginal analysis.

(b) Calculate Zeynep's consumer surplus from the second slice of pizza. Show your work.

(c) If Zeynep's weekly income decreases from $12 to $10, would Zeynep be able to buy 5 units of Good H and 3 slices of pizza? Explain using numbers.

(d) Suppose that pizza is produced in a perfectly competitive market and the price of cheese, an input to the production of pizza, increases. If pizza is a normal good, will the number of slices of pizza that will maximize Zeynep's total benefit increase, decrease, or stay the same? Explain.

(e) Suppose instead that the price of Good H decreases by 3% and Zeynep buys 6% more of Good H and 2% less of Good Z. Based on this change, identify whether Good H and Good Z are substitutes, complements, or not related. Explain using numbers.

29. Respond to all parts of the question.

Part A

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

2020 Short - Set 1

0	1 ✓

The response identifies that 4 units of Good H and 4 slices of pizza will maximize Zeynep's total benefit given her weekly income of $12 and explains that for the last unit of each good consumed the ratio of the marginal benefit to the price of Good H (6) is equal to the marginal benefit to the price of slices of pizza (6), or

$$\frac{MB_{Good\ H}}{Price_{Good\ H}} = \frac{MB_{Slices\ of\ Pizza}}{Price_{Slices\ of\ Pizza}}$$

$$\frac{\$12}{\$2} = \frac{\$6}{\$1}$$

$$6 = 6$$

Part B

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response calculates consumer surplus as $11 and shows the work.

$$\text{Consumer Surplus} = \text{Marginal Benefit} - \text{Price} = \ \$12 - 1 = \$11$$

Part C

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that no, Zeynep would not be able to buy 5 units of Good H and 3 slices of pizza and explains that her total expenditures would be $13 $(= \$2 \times 5 + \$1 \times 3)$, which is greater than her weekly income of $10.

Part D

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response states that the number of slices of pizza that will maximize Zeynep's total benefit will decrease and explains

2020 Short - Set 1

that an increase in the price of an input to production will decrease the supply of pizza, which will increase the price of pizza, and an increase in the price of pizza would increase the total cost of pizza purchased while the total benefit remains the same.

Part E

Select a point value to view scoring criteria, solutions, and/or examples and to score the response.

0	1 ✓

The response identifies Good H and Good Z as substitutes and explains that the cross-price elasticity of demand is positive because a 3% decrease in the price of Good H led to a 2% decrease in the demand for Good Z.