2020 AP Microeconomics Questions

Extracted from the AP Question Bank

87 items

Note: Because of the widespread of COVID-19, only Unit 6: Market Failure and the Role of Government was NOT tested in the 2020 Exam.

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Chapter 1

Long Questions

29 Questions

1.1 Perfect Competition

19 Questions

The table below shows the total costs faced by Allura's Little Robotics Company for different quantities of Good S sold.

Quantity	Total Cost
0	\$100
1	\$136
2	\$180
3	\$228
4	\$280
5	\$336
6	\$396
7	\$460
8	\$528
9	\$600
10	\$680

1. Allura's Little Robotics Company sells Good S in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is \$62 per unit.

   (a) Calculate the average fixed cost of producing 2 units. Show your work.

   (b) Identify the profit-maximizing quantity. Explain using marginal analysis.

   (c) Calculate the economic profit at the profit-maximizing quantity you identified in part (b). Show your work.

   (d) Based on your answer to part (c), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

   (e) Based on your answer to part (c), will the market price increase, decrease, or stay the same in the long run? Explain.

   (f) The income elasticity of demand for Good S is -0.5, and the cross-price elasticity of demand for toy robots with respect to the price of Good S is 0.8. Based on your answer to part (e), what will happen to the demand for toy robots? Explain.

   (g) Now assume that the market in which Allura's Little Robotics Company operates is in long-run equilibrium at a price of \$65 per unit.

      i. Suppose shipping costs per order for Allura's Little Robotics Company decrease. Will the profit-maximizing quantity of Good S for Allura's Little Robotics Company increase, decrease, or stay the same in the short run? Explain.

      ii. Instead suppose the government imposes a price ceiling of \$60 on the market for Good S. Will total economic surplus in the market for Good S increase, decrease, or stay the same in the short run as a result of the price ceiling? Explain.

The table below shows the total costs faced by Dave's General Store for different quantities of Good X sold.

Quantity	Total Cost
0	$100
1	$110
2	$140
3	$190
4	$290
5	$440
6	$640
7	$900
8	$1,230
9	$1,640
10	$2,140

2. Dave's General Store sells Good X in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is $120 per unit.

   (a) Calculate the average fixed cost of producing 5 units. Show your work.

   (b) Identify the profit-maximizing quantity. Explain using marginal analysis.

   (c) Calculate the economic profit at the profit-maximizing quantity you identified in part (b). Show your work.

   (d) Based on your answer to part (c), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

   (e) Based on your answer to part (c), will the market price increase, decrease, or stay the same in the long run? Explain.

   (f) The income elasticity of demand for Good X is 2.5, and the cross-price elasticity of demand for shoes with respect to the price of Good X is -0.4. Based on your answer to part (e), what will happen to the demand for shoes? Explain.

   (g) Now assume that the market in which Dave's General Store operates is in long-run equilibrium.

      i. Suppose the rent paid by Dave's General Store decreases. Will Dave's General Store's profit-maximizing quantity of Good X increase, decrease, or stay the same in the short run? Explain.

      ii. Instead suppose Dave's General Store hires labor in a perfectly competitive market and the market wage increases. Will Dave's General Store's profit-maximizing quantity of Good X increase, decrease, or stay the same in the short run? Explain.

The table below shows the total variable costs faced by Emily's Eye Care Store for different quantities of Good M sold.

Quantity	Total Variable Cost
1	\$20
2	\$25
3	\$35
4	\$50
5	\$70
6	\$95
7	\$125
8	\$160
9	\$200
10	\$245

3. Emily's Eye Care Store sells Good M in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is \$33 per unit, and the total fixed cost is \$30.

   (a) Identify the profit-maximizing quantity. Explain using marginal analysis.

   (b) Calculate the economic profit at the profit-maximizing quantity you identified in part (a). Show your work.

   (c) Calculate the average fixed cost of producing 6 units. Show your work.

   (d) Based on your answer to part (b), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

   (e) Based on your answer to part (b), will the market price increase, decrease, or stay the same in the long run? Explain.

   (f) The income elasticity of demand for Good M is 1.4, and the cross-price elasticity of demand for eyeglasses with respect to the price of Good M is -0.75. Based on your answer to part (e), what will happen to the demand for eyeglasses? Explain.

   (g) Now assume that the market in which Emily's Eye Care Store operates is in long-run equilibrium at a price of \$30 per unit.

      i. Suppose annual property taxes for Emily's Eye Care Store increase by \$2,000. Will the profit-maximizing quantity of Good M for Emily's Eye Care Store increase, decrease, or stay the same in the short run? Explain.

      ii. Instead suppose the government imposes a price floor at \$35 on the market for Good M. Will deadweight loss in the market for Good M increase, decrease, or stay the same in the short run as a result of the price floor? Explain.

The table below shows the total costs faced by Hank's Clothing Emporium for different quantities of Good A sold.

Quantity	Total Cost
0	\$80
1	\$130
2	\$185
3	\$255
4	\$330
5	\$410
6	\$510
7	\$640
8	\$800
9	\$995
10	\$1230

4. Hank's Clothing Emporium sells Good A in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is \$60 per unit.

   (a) Calculate the average fixed cost of producing 5 units. Show your work.

   (b) Identify the profit-maximizing quantity. Explain using marginal analysis.

   (c) Calculate the economic profit at the profit-maximizing quantity you identified in part (b). Show your work.

   (d) Based on your answer to part (c), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

   (e) Based on your answer to part (c), will the market price increase, decrease, or stay the same in the long run? Explain.

   (f) The income elasticity of demand for Good A is -2, and the cross-price elasticity of demand for khaki pants with respect to the price of Good A is 0.8 . Based on your answer to part (e), what will happen to the demand for khaki pants? Explain.

   (g) Now assume that the market in which Hank's Clothing Emporium operates is in long-run equilibrium.

      i. Suppose the rent paid by Hank's Clothing Emporium increases. Will Hank's Clothing Emporium's profit-maximizing quantity of Good A increase, decrease, or stay the same in the short run? Explain.

      ii. Instead suppose Hank's Clothing Emporium hires labor in a perfectly competitive market and the market wage decreases. Will Hank's Clothing Emporium's profit-maximizing quantity of Good A increase, decrease, or stay the same in the short run? Explain.

The table below shows the total variable costs faced by Julia's Accessories Store for different quantities of Good E sold.

Quantity	Total Variable Cost
1	$35
2	$73
3	$113
4	$154
5	$198
6	$248
7	$303
8	$360
9	$421
10	$498

5. Julia's Accessories Store sells Good E in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is $62 per unit, and the total fixed cost is $152.

   (a) Identify the profit-maximizing quantity. Explain using marginal analysis.

   (b) Calculate the economic profit at the profit-maximizing quantity you identified in part (a). Show your work.

   (c) Calculate the average fixed cost of producing 8 units. Show your work.

   (d) Based on your answer to part (b), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

   (e) Based on your answer to part (b), will the market price increase, decrease, or stay the same in the long run? Explain.

   (f) The income elasticity of demand for Good E is -1.2, and the cross-price elasticity of demand for bracelets with respect to the price of Good E is 0.6. Based on your answer to part (e), what will happen to the demand for bracelets? Explain.

   (g) Now assume that the market in which Julia's Accessories Store operates is in long-run equilibrium.

      i. Suppose the market demand for Good E decreases. Will the profit-maximizing quantity of Good E for Julia's Accessories Store increase, decrease, or stay the same in the short run? Explain.

      ii. Suppose instead the wages that Julia's Accessories Store pays its workers increase. Will the profit-maximizing quantity of Good E for Julia's Accessories Store increase, decrease, or stay the same in the short run? Explain.

The table below shows the total costs faced by Kailas's Wholesale Market for different quantities of Good Z sold.

Quantity	Total Cost
0	$30
1	$55
2	$95
3	$140
4	$200
5	$280
6	$380
7	$500
8	$640
9	$800
10	$980

6. Kailas's Wholesale Market sells Good Z in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is $90 per unit.

   (a) Calculate the average fixed cost of producing 3 units. Show your work.

   (b) Identify the profit-maximizing quantity. Explain using marginal analysis.

   (c) Calculate the economic profit at the profit-maximizing quantity you identified in part (b). Show your work.

   (d) Based on your answer to part (c), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

   (e) Based on your answer to part (c), will the market price increase, decrease, or stay the same in the long run? Explain.

   (f) The income elasticity of demand for Good Z is 2, and the cross-price elasticity of demand for chairs with respect to the price of Good Z is 0.4. Based on your answer to part (e), what will happen to the demand for chairs? Explain.

   (g) Now assume that the market in which Kailas's Wholesale Market operates is in long-run equilibrium.

      i. Suppose the rent paid by Kailas's Wholesale Market decreases. Will Kailas's Wholesale Market's profit-maximizing quantity of Good Z increase, decrease, or stay the same in the short run? Explain.

      ii. Instead suppose Kailas's Wholesale Market hires labor in a perfectly competitive market and the market wage increases. Will Kailas's Wholesale Market's profit-maximizing quantity of Good Z increase, decrease, or stay the same in the short run? Explain.

The table below shows the total variable costs faced by Karen's Kaleidoscope Store for different quantities of Good N sold.

Quantity	Total Variable Cost
1	\$30
2	\$70
3	\$120
4	\$180
5	\$250
6	\$340
7	\$435
8	\$535
9	\$645
10	\$760

7. Karen's Kaleidoscope Store sells Good N in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is \$80 per unit, and the total fixed cost is \$300.

   (a) Identify the profit-maximizing quantity. Explain using marginal analysis.

   (b) Calculate the economic profit at the profit-maximizing quantity you identified in part (a). Show your work.

   (c) Calculate the average fixed cost of producing 3 units. Show your work.

   (d) Based on your answer to part (b), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

   (e) Based on your answer to part (b), will the market price increase, decrease, or stay the same in the long run? Explain.

   (f) The income elasticity of demand for Good N is -1.8, and the cross-price elasticity of demand for kaleidoscopes with respect to the price of Good N is -0.5.Based on your answer to part (e), what will happen to the demand for kaleidoscopes? Explain.

   (g) Now assume that the market in which Karen's Kaleidoscope Store operates is in long-run equilibrium at a price of \$85 per unit.

      i. Suppose annual property taxes for Karen's Kaleidoscope Store decrease by \$2,500. Will the profit-maximizing quantity of Good N for Karen's Kaleidoscope Store increase, decrease, or stay the same in the short run? Explain.

      ii. Instead suppose the government imposes a price floor at \$75 on the market for Good N. Will deadweight loss in the market for Good N increase, decrease, or stay the same in the short run as a result of the price floor? Explain.

The table below shows the total costs faced by Kiyoshi's Clothing Store for different quantities of Good F sold.

Quantity	Total Cost
0	$8
1	$18
2	$32
3	$48
4	$72
5	$104
6	$144
7	$192
8	$248
9	$312
10	$384

8. Kiyoshi's Clothing Store sells Good F in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is $60 per unit.

   (a) Calculate the average fixed cost of producing 4 units. Show your work.

   (b) Identify the profit-maximizing quantity. Explain using marginal analysis.

   (c) Calculate the economic profit at the profit-maximizing quantity you identified in part (b). Show your work.

   (d) Based on your answer to part (c), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

   (e) Based on your answer to part (c), will the market price increase, decrease, or stay the same in the long run? Explain.

   (f) The income elasticity of demand for Good F is 3, and the cross-price elasticity of demand for gloves with respect to the price of Good F is 0.5. Based on your answer to part (e), what will happen to the demand for gloves? Explain.

   (g) Now assume that the market in which Kiyoshi's Clothing Store operates is in long-run equilibrium at a price of $50 per unit.

      i. Suppose the government imposes a price floor at $55 per unit on the market for Good F. Will consumer surplus in the market for Good F increase, decrease, or stay the same in the short run as a result of the price floor? Explain.

      ii. Suppose instead the cost of energy, a variable cost for Kiyoshi's Clothing Store, increases. Will the profit-maximizing quantity of Good F for Kiyoshi's Clothing Store increase, decrease, or stay the same in the short run? Explain.

9. The table below shows the total costs faced by Lynda's Office Supply Store for different quantities of Good P sold.

Quantity	Total Cost
0	$12
1	$22
2	$52
3	$102
4	$172
5	$252
6	$342
7	$442
8	$552
9	$672
10	$802

Lynda's Office Supply Store sells Good P in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is $45 per unit.

(a) Calculate the average fixed cost of producing 4 units. Show your work.

(b) Identify the profit-maximizing quantity. Explain using marginal analysis.

(c) Calculate the economic profit at the profit-maximizing quantity you identified in part (b). Show your work.

(d) Based on your answer to part (c), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

(e) Based on your answer to part (c), will the market price increase, decrease, or stay the same in the long run? Explain.

(f) The income elasticity of demand for Good P is 1.8, and the cross-price elasticity of demand for chair mats with respect to the price of Good P is 0.9. Based on your answer to part (e), what will happen to the demand for chair mats? Explain.

(g) Now assume that the market in which Lynda's Office Supply Store operates is in long-run equilibrium at a price of $40 per unit.

i. Suppose shipping costs per order for Lynda's Office Supply Store increase. Will the profit-maximizing quantity of Good P for Lynda's Office Supply Store increase, decrease, or stay the same in the short run? Explain.

ii. Instead suppose the government imposes a price ceiling of $50 on the market for Good P. Will total economic surplus in the market for Good P increase, decrease, or stay the same in the short run as a result of the price ceiling? Explain.

The table below shows the total variable costs faced by Raskin's Clothing Store for different quantities of Good D sold.

Quantity	Total Variable Cost
1	$50
2	$105
3	$161
4	$218
5	$276
6	$335
7	$410
8	$540
9	$695
10	$875

10. Raskin's Clothing Store sells Good D in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is $150 per unit, and the total fixed cost is $85.

    (a) Identify the profit-maximizing quantity. Explain using marginal analysis.

    (b) Calculate the economic profit at the profit-maximizing quantity you identified in part (a). Show your work.

    (c) Calculate the average fixed cost of producing 10 units. Show your work.

    (d) Based on your answer to part (b), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

    (e) Based on your answer to part (b), will the market price increase, decrease, or stay the same in the long run? Explain.

    (f) The income elasticity of demand for Good D is 1.2, and the cross-price elasticity of demand for dresses with respect to the price of Good D is 0.2. Based on your answer to part (e), what will happen to the demand for dresses? Explain.

    (g) Now assume that the market in which Raskin's Clothing Store operates is in long-run equilibrium.

        i. Suppose the market demand for Good D increases. Will the profit-maximizing quantity of Good D for Raskin's Clothing Store increase, decrease, or stay the same in the short run? Explain.

        ii. Suppose instead the wages that Raskin's Clothing Store pays its workers decrease. Will the profit-maximizing quantity of Good D for Raskin's Clothing Store increase, decrease, or stay the same in the short run? Explain.

The table below shows the total variable costs faced by Saif's General Store for different quantities of Good C sold.

Quantity	Total Variable Cost
1	\$50
2	\$103
3	\$165
4	\$232
5	\$310
6	\$393
7	\$481
8	\$581
9	\$690
10	\$810

11. Saif's General Store sells Good C in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is \$90 per unit, and the total fixed cost is \$275.

    (a) Identify the profit-maximizing quantity. Explain using marginal analysis.

    (b) Calculate the economic profit at the profit-maximizing quantity you identified in part (a). Show your work.

    (c) Calculate the average fixed cost of producing 5 units. Show your work.

    (d) Based on your answer to part (b), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

    (e) Based on your answer to part (b), will the market price increase, decrease, or stay the same in the long run? Explain.

    (f) The income elasticity of demand for Good C is -1.5, and the cross-price elasticity of demand for hats with respect to the price of Good C is -0.6. Based on your answer to part (e), what will happen to the demand for hats? Explain.

    (g) Now assume that the market in which Saif's General Store operates is in long-run equilibrium.

        i. Suppose the market demand for Good C decreases. Will the profit-maximizing quantity of Good C for Saif's General Store increase, decrease, or stay the same in the short run? Explain.

        ii. Suppose instead the wages that Saif's General Store pays its workers increase. Will the profit-maximizing quantity of Good C for Saif's General Store increase, decrease, or stay the same in the short run? Explain.

The table below shows the total costs faced by Sarah's Tool Store for different quantities of Good J sold.

Quantity	Total Cost
0	\$110
1	\$145
2	\$175
3	\$200
4	\$220
5	\$245
6	\$275
7	\$310
8	\$350
9	\$395
10	\$445

12. Sarah's Tool Store sells Good J in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is \$42 per unit.

    (a) Calculate the average fixed cost of producing 5 units. Show your work.

    (b) Identify the profit-maximizing quantity. Explain using marginal analysis.

    (c) Calculate the economic profit at the profit-maximizing quantity you identified in part (b). Show your work.

    (d) Based on your answer to part (c), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

    (e) Based on your answer to part (c), will the market price increase, decrease, or stay the same in the long run? Explain.

    (f) The income elasticity of demand for Good J is -1.4, and the cross-price elasticity of demand for widgets with respect to the price of Good J is -0.25. Based on your answer to part (e), what will happen to the demand for widgets? Explain.

    (g) Now assume that the market in which Sarah's Tool Store operates is in long-run equilibrium at a price of \$45 per unit.

        i. Suppose the government imposes a price floor at \$40 per unit on the market for Good J. Will consumer surplus in the market for Good J increase, decrease, or stay the same in the short run as a result of the price floor? Explain.

        ii. Suppose instead the cost of energy, a variable cost for Sarah's Tool Store, decreases. Will the profit-maximizing quantity of Good J for Sarah's Tool Store increase, decrease, or stay the same in the short run? Explain.

The table below shows the total costs faced by Sophia's Lighting Store for different quantities of Good H sold.

Quantity	Total Cost
0	\$50
1	\$90
2	\$110
3	\$115
4	\$140
5	\$180
6	\$250
7	\$335
8	\$440
9	\$565
10	\$710

13. Sophia's Lighting Store sells Good H in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is \$140 per unit.

    (a) Calculate the average fixed cost of producing 2 units. Show your work.

    (b) Identify the profit-maximizing quantity. Explain using marginal analysis.

    (c) Calculate the economic profit at the profit-maximizing quantity you identified in part (b). Show your work.

    (d) Based on your answer to part (c), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

    (e) Based on your answer to part (c), will the market price increase, decrease, or stay the same in the long run? Explain.

    (f) The income elasticity of demand for Good H is 1.3, and the cross-price elasticity of demand for desk lamps with respect to the price of Good H is -0.9. Based on your answer to part (e), what will happen to the demand for desk lamps? Explain.

    (g) Now assume that the market in which Sophia's Lighting Store operates is in long-run equilibrium at a price of \$130 per unit.

        i. Suppose the government imposes a price floor at \$150 per unit on the market for Good H. Will consumer surplus in the market for Good H increase, decrease, or stay the same in the short run as a result of the price floor? Explain.

        ii. Suppose instead the cost of energy, a variable cost for Sophia's Lighting Store, increases. Will the profit-maximizing quantity of Good H for Sophia's Lighting Store increase, decrease, or stay the same in the short run? Explain.

The table below shows the total costs faced by Surisitee's Sporting Goods Store for different quantities of Good Y sold.

Quantity	Total Cost
0	$85
1	$105
2	$130
3	$165
4	$210
5	$290
6	$410
7	$580
8	$810
9	$1,110
10	$1,490

14. Surisitee's Sporting Goods Store sells Good Y in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is $40 per unit.

    (a) Calculate the average fixed cost of producing 2 units. Show your work.

    (b) Identify the profit-maximizing quantity. Explain using marginal analysis.

    (c) Calculate the economic profit at the profit-maximizing quantity you identified in part (b). Show your work.

    (d) Based on your answer to part (c), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

    (e) Based on your answer to part (c), will the market price increase, decrease, or stay the same in the long run? Explain.

    (f) The income elasticity of demand for Good Y is -2.5, and the cross-price elasticity of demand for basketballs with respect to the price of Good Y is -0.8. Based on your answer to part (e), what will happen to the demand for basketballs? Explain.

    (g) Now assume that the market in which Surisitee's Sporting Goods Store operates is in long-run equilibrium.

        i. Suppose the rent paid by Surisitee's Sporting Goods Store increases. Will Surisitee's Sporting Goods Store's profit-maximizing quantity of Good Y increase, decrease, or stay the same in the short run? Explain.

        ii. Instead suppose Surisitee's Sporting Goods Store hires labor in a perfectly competitive market and the market wage decreases. Will Surisitee's Sporting Goods Store's profit-maximizing quantity of Good Y increase, decrease, or stay the same in the short run? Explain.

The table below shows the total variable costs faced by Steve's Home Appliances Store for different quantities of Good L sold.

Quantity	Total Variable Cost
1	\$55
2	\$105
3	\$152
4	\$205
5	\$270
6	\$345
7	\$428
8	\$525
9	\$630
10	\$745

15. Steve's Home Appliances Store sells Good L in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is \$80 per unit, and the total fixed cost is \$145.

    (a) Identify the profit-maximizing quantity. Explain using marginal analysis.

    (b) Calculate the economic profit at the profit-maximizing quantity you identified in part (a). Show your work.

    (c) Calculate the average fixed cost of producing 5 units. Show your work.

    (d) Based on your answer to part (b), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

    (e) Based on your answer to part (b), will the market price increase, decrease, or stay the same in the long run? Explain.

    (f) The income elasticity of demand for Good L is -0.8, and the cross-price elasticity of demand for coffee machines with respect to the price of Good L is 0.25. Based on your answer to part (e), what will happen to the demand for coffee machines? Explain.

    (g) Now assume that the market in which Steve's Home Appliances Store operates is in long-run equilibrium at a price of \$90 per unit.

        i. Suppose annual property taxes for Steve's Home Appliances Store decrease by \$7,000. Will the profit-maximizing quantity of Good L for Steve's Home Appliances Store increase, decrease, or stay the same in the short run? Explain.

        ii. Instead suppose the government imposes a price floor at \$70 on the market for Good L. Will deadweight loss in the market for Good L increase, decrease, or stay the same in the short run as a result of the price floor? Explain.

The table below shows the total variable costs faced by Tom's Toy Store for different quantities of Good B sold.

Quantity	Total Variable Cost
1	\$3
2	\$8
3	\$14
4	\$23
5	\$38
6	\$58
7	\$83
8	\$113
9	\$148
10	\$188

16. Tom's Toy Store sells Good B in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is \$21 per unit, and the total fixed cost is \$50.

    (a) Identify the profit-maximizing quantity. Explain using marginal analysis.

    (b) Calculate the economic profit at the profit-maximizing quantity you identified in part (a). Show your work.

    (c) Calculate the average fixed cost of producing 4 units. Show your work.

    (d) Based on your answer to part (b), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

    (e) Based on your answer to part (b), will the market price increase, decrease, or stay the same in the long run? Explain.

    (f) The income elasticity of demand for Good B is 1.5, and the cross-price elasticity of demand for teddy bears with respect to the price of Good B is -0.2. Based on your answer to part (e), what will happen to the demand for teddy bears? Explain.

    (g) Now assume that the market in which Tom's Toy Store operates is in long-run equilibrium.

        i. Suppose the market demand for Good B increases. Will the profit-maximizing quantity of Good B for Tom's Toy Store increase, decrease, or stay the same in the short run? Explain.

        ii. Suppose instead the wages that Tom's Toy Store pays its workers decrease. Will the profit-maximizing quantity of Good B for Tom's Toy Store increase, decrease, or stay the same in the short run? Explain.

The table below shows the total costs faced by Yotti's Craft Store for different quantities of Good R sold.

Quantity	Total Cost
0	\$3
1	\$12
2	\$18
3	\$28
4	\$42
5	\$60
6	\$82
7	\$108
8	\$138
9	\$172
10	\$210

17. Yotti's Craft Store sells Good R in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is \$12 per unit.

    (a) Calculate the average fixed cost of producing 4 units. Show your work.

    (b) Identify the profit-maximizing quantity. Explain using marginal analysis.

    (c) Calculate the economic profit at the profit-maximizing quantity you identified in part (b). Show your work.

    (d) Based on your answer to part (c), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

    (e) Based on your answer to part (c), will the market price increase, decrease, or stay the same in the long run? Explain.

    (f) The income elasticity of demand for Good R is 0.8, and the cross-price elasticity of demand for balls of yarn with respect to the price of Good R is -0.1. Based on your answer to part (e), what will happen to the demand for balls of yarn? Explain.

    (g) Now assume that the market in which Yotti's Craft Store operates is in long-run equilibrium at a price of \$10 per unit.

        i. Suppose shipping costs per order for Yotti's Craft Store increase. Will the profit-maximizing quantity of Good R for Yotti's Craft Store increase, decrease, or stay the same in the short run? Explain.

        ii. Instead suppose the government imposes a price ceiling of \$15 on the market for Good R. Will total economic surplus in the market for Good R increase, decrease, or stay the same in the short run as a result of the price ceiling? Explain.

The table below shows the total costs faced by Faizah's Manufacturing Firm for different quantities of Good G sold.

Quantity	Total Cost
0	\$64
1	\$79
2	\$98
3	\$120
4	\$145
5	\$171
6	\$198
7	\$228
8	\$262
9	\$305
10	\$353

18. Faizah's Manufacturing Firm sells Good G in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is \$32 per unit.

    (a) Calculate the average fixed cost of producing 8 units. Show your work.

    (b) Identify the profit-maximizing quantity. Explain using marginal analysis.

    (c) Calculate the economic profit at the profit-maximizing quantity you identified in part (b). Show your work.

    (d) Based on your answer to part (c), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

    (e) Based on your answer to part (c), will the market price increase, decrease, or stay the same in the long run? Explain.

    (f) The income elasticity of demand for Good G is -3, and the cross-price elasticity of demand for gizmos with respect to the price of Good G is 0.1. Based on your answer to part (e), what will happen to the demand for gizmos? Explain.

    (g) Now assume that the market in which Faizah's Manufacturing Firm operates is in long-run equilibrium at a price of \$35 per unit.

        i. Suppose the government imposes a price floor at \$30 per unit on the market for Good G. Will consumer surplus in the market for Good G increase, decrease, or stay the same in the short run as a result of the price floor? Explain.

        ii. Suppose instead the cost of energy, a variable cost for Faizah's Manufacturing Firm, decreases. Will the profit-maximizing quantity of Good G for Faizah's Manufacturing Firm increase, decrease, or stay the same in the short run? Explain.

The table below shows the total costs faced by Susie's Diner for different quantities of Good Q sold.

Quantity	Total Cost
0	$25
1	$29
2	$31
3	$34
4	$40
5	$49
6	$61
7	$76
8	$94
9	$115
10	$139

19. Susie's Diner sells Good Q in a perfectly competitive market with a downward-sloping demand curve and an upward-sloping supply curve. The market price is $8 per unit.

    (a) Calculate the average fixed cost of producing 2 units. Show your work.

    (b) Identify the profit-maximizing quantity. Explain using marginal analysis.

    (c) Calculate the economic profit at the profit-maximizing quantity you identified in part (b). Show your work.

    (d) Based on your answer to part (c), will the number of firms in the industry increase, decrease, or stay the same in the long run? Explain.

    (e) Based on your answer to part (c), will the market price increase, decrease, or stay the same in the long run? Explain.

    (f) The income elasticity of demand for Good Q is -1.3, and the cross-price elasticity of demand for cheeseburgers with respect to the price of Good Q is -0.3. Based on your answer to part (e), what will happen to the demand for cheeseburgers? Explain.

    (g) Now assume that the market in which Susie's Diner operates is in long-run equilibrium at a price of $10 per unit.

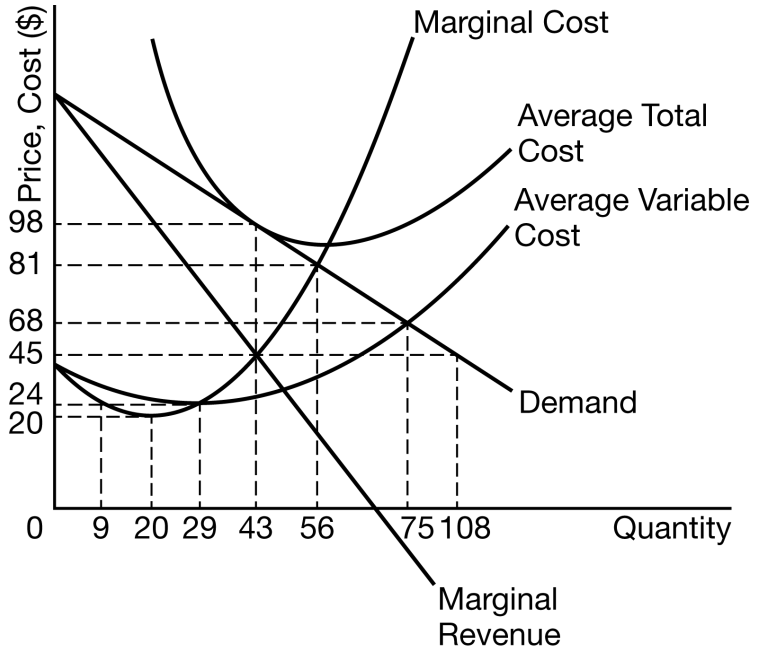
        i. Suppose delivery costs per order for Susie's Diner decrease. Will the profit-maximizing quantity of Good Q for Susie's Diner increase, decrease, or stay the same in the short run? Explain.

        ii. Instead suppose the government imposes a price ceiling of $6 on the market for Good Q. Will total economic surplus in the market for Good Q increase, decrease, or stay the same in the short run as a result of the price ceiling? Explain.

1.2 Monopoly Graph and Payoff Matrix

10 Questions

Use the graph provided below to answer parts (a)-(e).



1. BetterCook, a profit-maximizing firm, has a patent on a kitchen appliance, making it the only producer of that appliance. The graph above shows BetterCook's demand, marginal revenue, average total cost, average variable cost, and marginal cost curves.

   (a) Calculate BetterCook's total revenue if the firm produces the allocatively efficient quantity. Show your work.

   (b) Starting at a price of $68, if BetterCook were to decrease the price by 3%, will the quantity demanded increase by more than 3%, by less than 3%, or by exactly 3%? Explain.

   (c) At a quantity of 29 units, is BetterCook's marginal product increasing, decreasing, or constant? Explain.

   (d) Identify the quantity that maximizes BetterCook's profit. Explain.

   (e) At the quantity identified in part (d), does BetterCook earn a positive economic profit, a negative economic profit, or zero economic profit? Explain.

   Assume that BetterCook's patent expires. Scheff, a company with the capability to produce the same kitchen appliance as BetterCook, intends to enter the market and charge a lower price than BetterCook for the kitchen appliance. BetterCook is considering whether to maintain its price or to lower its price to match Scheff's price. Scheff is considering whether to advertise its entry into the market.
   The matrix below shows the payoffs for each combination of strategies, and both players (BetterCook and Scheff) have complete information. The first entry in each cell represents BetterCook's payoff and the second entry represents Scheff's payoff. Each player independently and simultaneously chooses its strategy. Use the matrix provided below to answer parts (f)-(h).

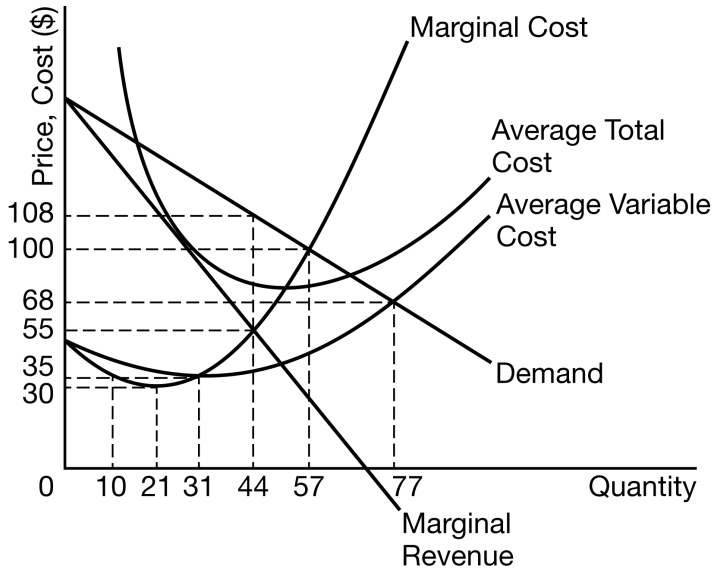
		Scheff	
		Advertise	Not Advertise
BetterCook	Maintain Price	$400, $150	$600, $250
	Lower Price	$300, $650	$200, $450

   (f) Does Scheff have a dominant strategy? Explain using numbers from the payoff matrix.

   (g) Identify the Nash equilibrium. Explain why this is a Nash equilibrium using information from the payoff matrix.

   (h) Suppose Scheff makes a credible commitment to BetterCook that if BetterCook lowers its price, then Scheff will pay BetterCook $50. Will this offer result in a Nash equilibrium with different strategies from those identified in part (g)? Explain using numbers from the payoff matrix.

Use the graph provided below to answer parts (a)-(e).



2. BigMed, a profit-maximizing firm, has a patent on a medical device, making it the only producer of that device. The graph above shows BigMed's demand, marginal revenue, average total cost, average variable cost, and marginal cost curves.

   (a) Calculate BigMed's total revenue if the firm produces the allocatively efficient quantity. Show your work.

   (b) Starting at a price of \$100, if BigMed were to increase the price by 2%, will the quantity demanded decrease by more than 2%, by less than 2%, or by exactly 2%? Explain.

   (c) At a quantity of 10 units, is BigMed's marginal product increasing, decreasing, or constant? Explain.

   (d) Identify the quantity that maximizes BigMed's profit. Explain.

   (e) At the quantity identified in part (d), does BigMed earn a positive economic profit, a negative economic profit, or zero economic profit? Explain.

   Assume that BigMed's patent expires. Tauem, a company with the capability to produce the same medical device as BigMed, intends to enter the market and charge a lower price than BigMed for the medical device. BigMed is considering whether to maintain its price or to lower its price to match Tauem's price. Tauem is considering whether to advertise its entry into the market.
   The matrix below shows the payoffs for each combination of strategies, and both players (BigMed and Tauem) have complete information. The first entry in each cell represents BigMed's payoff and the second entry represents Tauem's payoff. Each player independently and simultaneously chooses its strategy. Use the matrix provided below to answer parts (f)-(h).

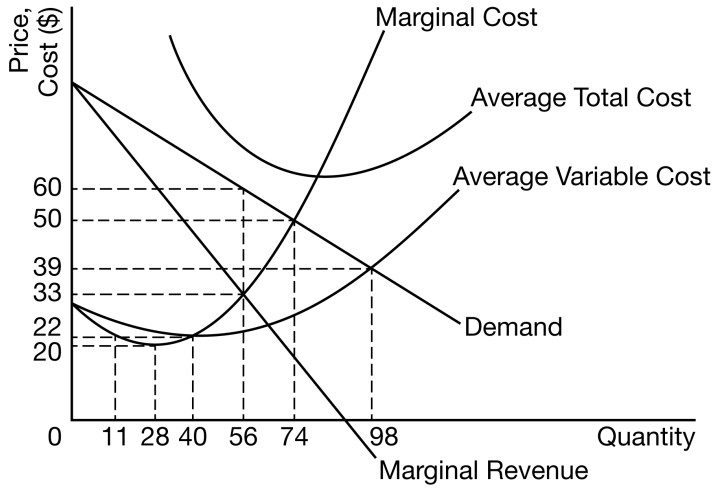
		Tauem	
		Advertise	Not Advertise
BigMed	Maintain Price	\$300, \$850	\$200, \$640
	Lower Price	\$420, \$350	\$100, \$250

   (f) Does Tauem have a dominant strategy? Explain using numbers from the payoff matrix.

   (g) Identify the Nash equilibrium. Explain why this is a Nash equilibrium using information from the payoff matrix.

   (h) Suppose Tauem makes a credible commitment to BigMed that if BigMed maintains its price, then Tauem will pay BigMed \$200. Will this offer result in a Nash equilibrium with different strategies from those identified in part (g)? Explain using numbers from the payoff matrix.

Use the graph provided below to answer parts (a)-(e).



3. CompAce, a profit-maximizing firm, has a patent on a computer accessory, making it the only producer of that computer accessory. The graph above shows CompAce's demand, marginal revenue, average total cost, average variable cost, and marginal cost curves.

   (a) Identify the quantity that maximizes CompAce's profit. Explain.

   (b) At the quantity identified in part (a), does CompAce earn a positive economic profit, a negative economic profit, or zero economic profit? Explain.

   (c) Calculate CompAce's total revenue if the firm produces the allocatively efficient quantity. Show your work.

   (d) At a price of $60, will CompAce continue to produce or will it shut down in the short run? Explain.

   (e) Assume that at 74 units, the average total cost is $62. If the total rent paid by CompAce increases by $370, calculate the firm's new average total cost at that output. Show your work.

   Assume that CompAce's patent expires. ScanzAll, a company with the capability to produce the same computer accessory as CompAce, intends to enter the market and charge a lower price than CompAce for the computer accessory. CompAce is considering whether to maintain its price or to lower its price to match ScanzAll's price. ScanzAll is considering whether or not to advertise its entry into the market.
   The matrix below shows the payoffs for each combination of strategies, and both players (CompAce and ScanzAll) have complete information. The first entry in each cell represents CompAce's payoff and the second entry represents ScanzAll's payoff. Each player independently and simultaneously chooses its strategy. Use the matrix provided below to answer parts (f)-(h).

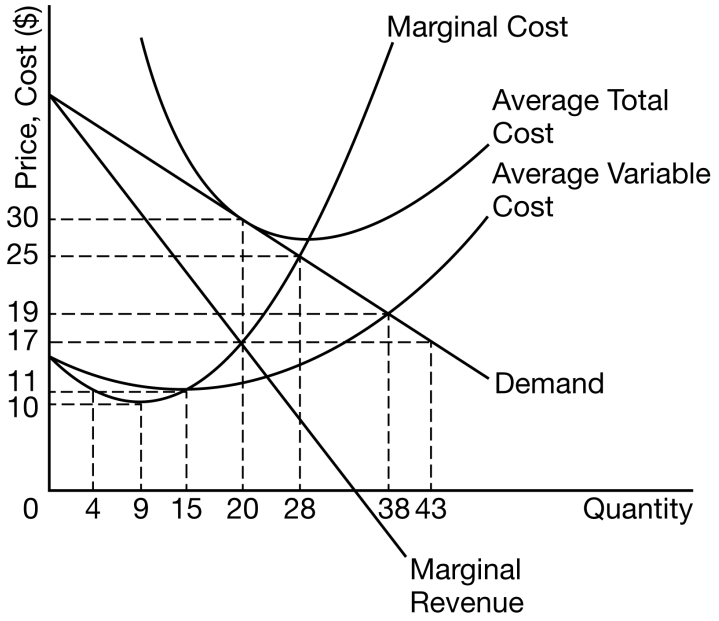
		ScanzAll	
		Not Advertise	Advertise
CompAce	Lower Price	$3,000 , $4,500	$4,000 , $3,500
	Maintain Price	$2,000 , $2,500	$1,800 , $7,500

   (f) Does CompAce have a dominant strategy? Explain using numbers from the payoff matrix.

   (g) Identify the Nash equilibrium. Explain why this is a Nash equilibrium using information from the payoff matrix.

   (h) Suppose ScanzAll makes a credible commitment to CompAce that if CompAce maintains its price, then ScanzAll will pay CompAce $600. Will this offer result in a Nash equilibrium with different strategies from those identified in part (g)? Explain using numbers from the payoff matrix.

Use the graph provided below to answer parts (a)-(e).



4. EarthScience, a profit-maximizing firm, has a patent on a carbon capture technology, making it the only producer of that technology. The graph above shows EarthScience's demand, marginal revenue, average total cost, average variable cost, and marginal cost curves.

   (a) Calculate EarthScience's total revenue if the firm produces the allocatively efficient quantity. Show your work.

   (b) Starting at a price of $30, if EarthScience were to increase the price by 6%, will the quantity demanded decrease by more than 6%, by less than 6%, or by exactly 6%? Explain.

   (c) At a quantity of 20 units, is EarthScience's marginal product increasing, decreasing, or constant? Explain.

   (d) Identify the quantity that maximizes EarthScience's profit. Explain.

   (e) At the quantity identified in part (d), does EarthScience earn a positive economic profit, a negative economic profit, or zero economic profit? Explain.

   Assume that EarthScience's patent expires. GeoSci, a company with the capability to produce the same technology as EarthScience, intends to enter the market and charge a lower price than EarthScience for the technology. EarthScience is considering whether to maintain its price or to lower its price to match GeoSci's price. GeoSci is considering whether or not to advertise its entry into the market.
   The matrix below shows the payoffs for each combination of strategies, and both players (EarthScience and GeoSci) have complete information. The first entry in each cell represents EarthScience's payoff and the second entry represents GeoSci's payoff. Each player independently and simultaneously chooses its strategy. Use the matrix provided below to answer parts (f)-(h).

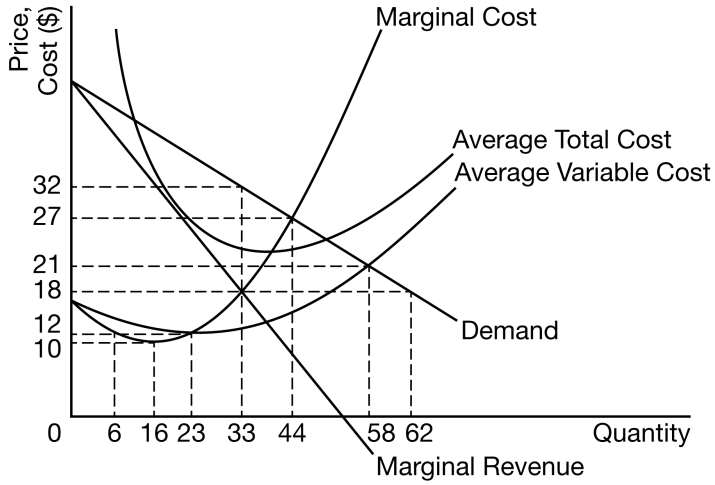
		GeoSci	
		Advertise	Not Advertise
EarthScience	Maintain Price	$520,$460	$400, $250
	Lower Price	$450, $350	$320, $650

   (f) Does EarthScience have a dominant strategy? Explain using numbers from the payoff matrix.

   (g) Identify the Nash equilibrium. Explain why this is a Nash equilibrium using information from the payoff matrix.

   (h) Suppose GeoSci makes a credible commitment to EarthScience that if EarthScience lowers its price, then GeoSci will pay EarthScience $150. Will this offer result in a Nash equilibrium with different strategies from those identified in part (g)? Explain using numbers from the payoff matrix.

Use the graph provided below to answer parts (a)-(e).



5. EyesOn, a profit-maximizing firm, has a patent on cameras, making it the only producer of that camera. The graph above shows EyesOn's demand, marginal revenue, average total cost, average variable cost, and marginal cost curves.

   (a) Identify the quantity that maximizes EyesOn's profit. Explain.

   (b) At the quantity identified in part (a), does EyesOn earn a positive economic profit, a negative economic profit, or zero economic profit? Explain.

   (c) Calculate EyesOn's total revenue if the firm produces the allocatively efficient quantity. Show your work.

   (d) At a price of $10, will EyesOn continue to produce or will it shut down in the short run? Explain.

   (e) Assume that at 44 units, the average total cost is $22. If the total wages paid by EyesOn increase by $220, calculate the firm's new average total cost at that output. Show your work.

   Assume that EyesOn's patent expires. ViewTime, a company with the capability to produce the same camera as EyesOn, intends to enter the market and charge a lower price than EyesOn for the camera. EyesOn is considering whether to maintain its price or to lower its price to match ViewTime's price. ViewTime is considering whether or not to advertise its entry into the market.
   The matrix below shows the payoffs for each combination of strategies, and both players (EyesOn and ViewTime) have complete information. The first entry in each cell represents EyesOn's payoff and the second entry represents ViewTime's payoff. Each player independently and simultaneously chooses its strategy. Use the matrix provided below to answer parts (f)-(h).

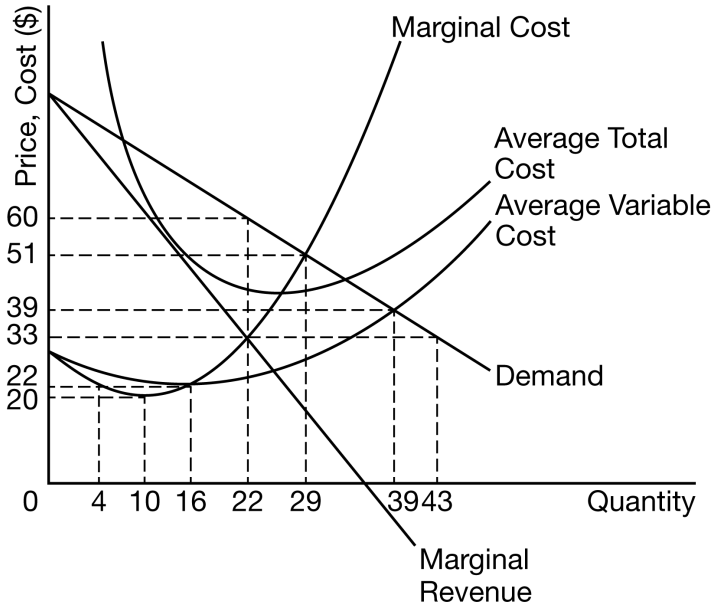
		ViewTime	
		Not Advertise	Advertise
EyesOn	Lower Price	$1,000 , $2,600	$4,000 , $3,400
	Maintain Price	$2,000 , $6,500	$3,000 , $7,500

   (f) Does EyesOn have a dominant strategy? Explain using numbers from the payoff matrix.

   (g) Identify the Nash equilibrium. Explain why this is a Nash equilibrium using information from the payoff matrix.

   (h) Suppose ViewTime makes a credible commitment to EyesOn that if EyesOn maintains the price, then ViewTime will pay EyesOn $500. Will this offer result in a Nash equilibrium with different strategies from those identified in part (g)? Explain using numbers from the payoff matrix.

Use the graph provided below to answer parts (a)-(e).



6. GarysGym, a profit-maximizing firm, has a patent on an exercise device, making it the only producer of that device. The graph above shows GarysGym's demand, marginal revenue, average total cost, average variable cost, and marginal cost curves.

   (a) Calculate GarysGym's total revenue if the firm produces the allocatively efficient quantity. Show your work.

   (b) Starting at a price of $39, if GarysGym were to decrease the price by 5%, will the quantity demanded increase by more than 5%, by less than 5%, or by exactly 5%? Explain.

   (c) At a quantity of 16 units, is GarysGym's marginal product increasing, decreasing, or constant? Explain.

   (d) Identify the quantity that maximizes GarysGym's profit. Explain.

   (e) At the quantity identified in part (d), does GarysGym earn a positive economic profit, a negative economic profit, or zero economic profit? Explain.

   Assume that GarysGym's patent expires. E-Fitness, a company with the capability to produce the same exercise device as GarysGym, intends to enter the market and charge a lower price than GarysGym for the exercise device. GarysGym is considering whether to maintain its price or to lower its price to match E-Fitness' price. E-Fitness is considering whether or not to advertise its entry into the market.
   The matrix below shows the payoffs for each combination of strategies, and both players (GarysGym and E-Fitness) have complete information. The first entry in each cell represents GarysGym's payoff and the second entry represents E-Fitness' payoff. Each player independently and simultaneously chooses its strategy. Use the matrix provided below to answer parts (f)-(h).

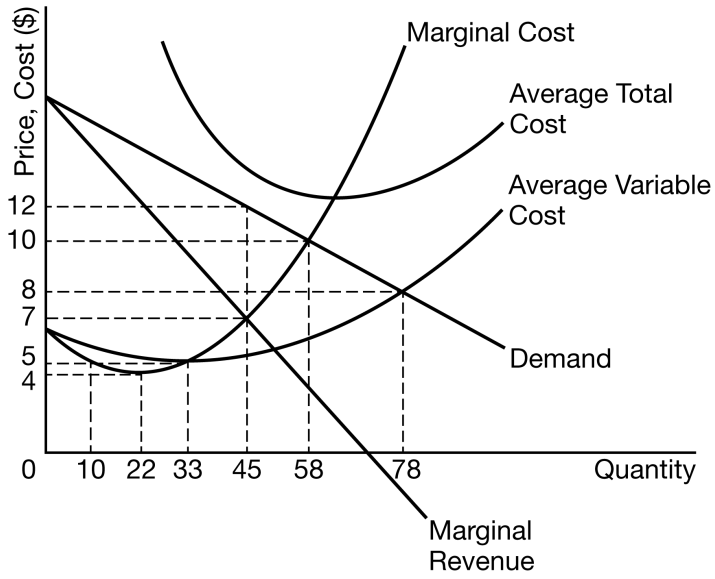
		E-Fitness	
		Advertise	Not Advertise
GarysGym	Maintain Price	$350, $450	$700, $300
	Lower Price	$580, $500	$460, $200

   (f) Does GarysGym have a dominant strategy? Explain using numbers from the payoff matrix.

   (g) Identify the Nash equilibrium. Explain why this is a Nash equilibrium using information from the payoff matrix.

   (h) Suppose GarysGym makes a credible commitment to E-Fitness that if E-Fitness does not advertise, then GarysGym will pay E-Fitness $100. Will this offer result in a Nash equilibrium with different strategies from those identified in part (g) ? Explain using numbers from the payoff matrix.

Use the graph provided below to answer parts (a)-(e).



7. GaterTools, a profit-maximizing firm, has a patent on a power tool, making it the only producer of that power tool. The graph above shows GaterTools' demand, marginal revenue, average total cost, average variable cost, and marginal cost curves.

   (a) Calculate GaterTools' total revenue if the firm produces the allocatively efficient quantity. Show your work.

   (b) Starting at a price of $12, if GaterTools were to increase the price by 4%, will the quantity demanded decrease by more than 4%, less than 4%, or exactly 4%? Explain.

   (c) At a quantity of 10 units, is GaterTools' marginal product increasing, decreasing, or constant? Explain.

   (d) Identify the quantity that maximizes GaterTools' profit. Explain.

   (e) At the quantity identified in part (d), does GaterTools earn a positive economic profit, a negative economic profit, or zero economic profit? Explain.

   Assume that GaterTools' patent expires. HandyBilt, a company with the capability to produce the same power tool as GaterTools, intends to enter the market and charge a lower price than GaterTools for the power tool. GaterTools is considering whether to maintain its price or to lower its price to match HandyBilt's price. HandyBilt is considering whether to advertise its entry into the market.
   The matrix below shows the payoffs for each combination of strategies, and both players (GaterTools and HandyBilt) have complete information. The first entry in each cell represents GaterTools' payoff and the second entry represents HandyBilt's payoff. Each player independently and simultaneously chooses its strategy. Use the matrix provided below to answer parts (f)-(h).

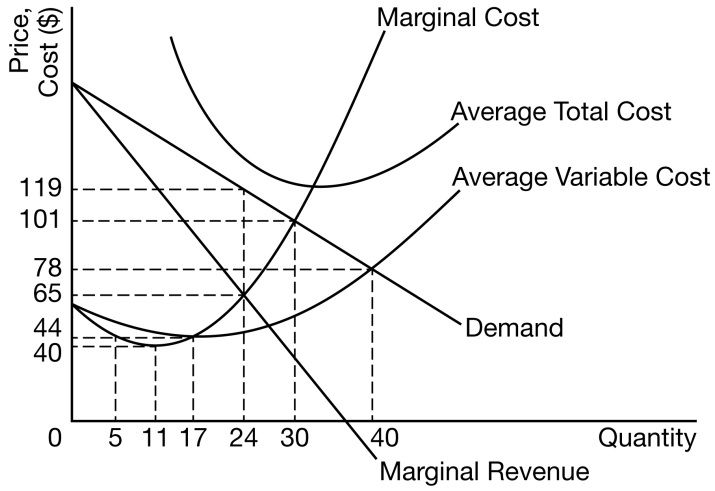
		HandyBilt	
		Advertise	Not Advertise
GaterTools	Maintain Price	$200, $850	$300, $250
	Lower Price	$420, $400	$520, $440

   (f) Does GaterTools have a dominant strategy? Explain using numbers from the payoff matrix.

   (g) Identify the Nash equilibrium. Explain why this is a Nash equilibrium using information from the payoff matrix.

   (h) Suppose HandyBilt makes a credible commitment to GaterTools that if GaterTools maintains its price, then HandyBilt will pay GaterTools $250. Will this offer result in a Nash equilibrium with different strategies from those identified in part (g)? Explain using numbers from the payoff matrix.

Use the graph provided below to answer parts (a)-(e).



8. MemorEyes, a profit-maximizing firm, has a patent on a learning aid, making it the only producer of that learning aid. The graph above shows MemorEyes' demand, marginal revenue, average total cost, average variable cost, and marginal cost curves.

   (a) Identify the quantity that maximizes MemorEyes' profit. Explain.

   (b) At the quantity identified in part (a), does MemorEyes earn a positive economic profit, a negative economic profit, or zero economic profit? Explain.

   (c) Calculate MemorEyes' total revenue if the firm produces the allocatively efficient quantity. Show your work.

   (d) At a price of $40, will MemorEyes continue to produce or will it shut down in the short run? Explain.

   (e) Assume that at 30 units, the average total cost is $120. If the total rent paid by MemorEyes increases by $450, calculate the firm's new average total cost at that output. Show your work.

   Assume that MemorEyes' patent expires. Cognitz, a company with the capability to produce the same learning aid as MemorEyes, intends to enter the market and charge a lower price than MemorEyes for the learning aid. MemorEyes is considering whether to maintain its price or to lower its price to match Cognitz' price. Cognitz is considering whether or not to advertise its entry into the market.
   The matrix below shows the payoffs for each combination of strategies, and both players (MemorEyes and Cognitz) have complete information. The first entry in each cell represents MemorEyes' payoff and the second entry represents Cognitz' payoff. Each player independently and simultaneously chooses its strategy. Use the matrix provided below to answer parts (f)-(h).

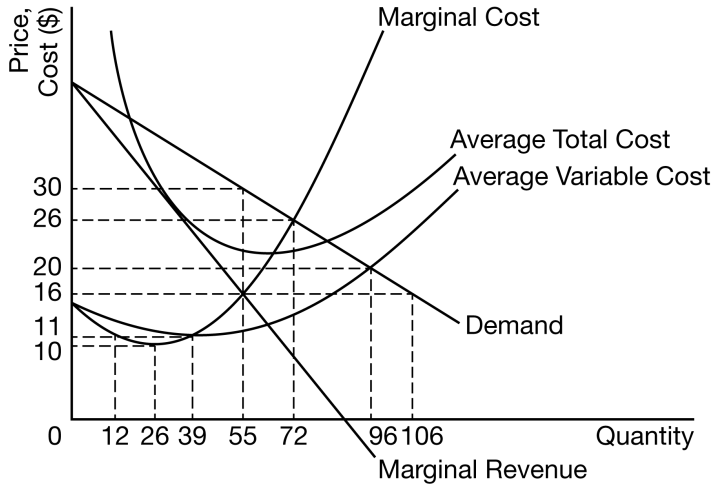
		Cognitz	
		Not Advertise	Advertise
MemorEyes	Lower Price	$3,000 , $3,400	$4,000 , $2,500
	Maintain Price	$2,000 , $6,500	$3,000 , $8,500

   (f) Does Cognitz have a dominant strategy? Explain using numbers from the payoff matrix.

   (g) Identify the Nash equilibrium. Explain why this is a Nash equilibrium using information from the payoff matrix.

   (h) Suppose Cognitz makes a credible commitment to MemorEyes that if MemorEyes maintains its price, then Cognitz will pay MemorEyes $1,500. Will this offer result in a Nash equilibrium with different strategies from those identified in part (g)? Explain using numbers from the payoff matrix.

Use the graph provided below to answer parts (a)-(e).



9. NanoWare, a profit-maximizing firm, has a patent on software, making it the only producer of that software. The graph above shows NanoWare's demand, marginal revenue, average total cost, average variable cost, and marginal cost curves.

   (a) Identify the quantity that maximizes NanoWare's profit. Explain.

   (b) At the quantity identified in part (a), does NanoWare earn a positive economic profit, a negative economic profit, or zero economic profit? Explain.

   (c) Calculate NanoWare's total revenue if the firm produces the allocatively efficient quantity. Show your work.

   (d) At a price of $26, will NanoWare continue to produce or will it shut down in the short run? Explain.

   (e) Assume that at 72 units, the average total cost is $22. If the total advertising costs paid by NanoWare increase by $216, calculate the firm's new average total cost at that output. Show your work.

   Assume that NanoWare's patent expires. HotCode, a company with the capability to produce the same software as NanoWare, intends to enter the market and charge a lower price than NanoWare for the software. NanoWare is considering whether to maintain its price or to lower its price to match HotCode's price. HotCode is considering whether or not to advertise its entry into the market.
   The matrix below shows the payoffs for each combination of strategies, and both players (NanoWare and HotCode) have complete information. The first entry in each cell represents NanoWare's payoff and the second entry represents HotCode's payoff. Each player independently and simultaneously chooses its strategy. Use the matrix provided below to answer parts (f)-(h).

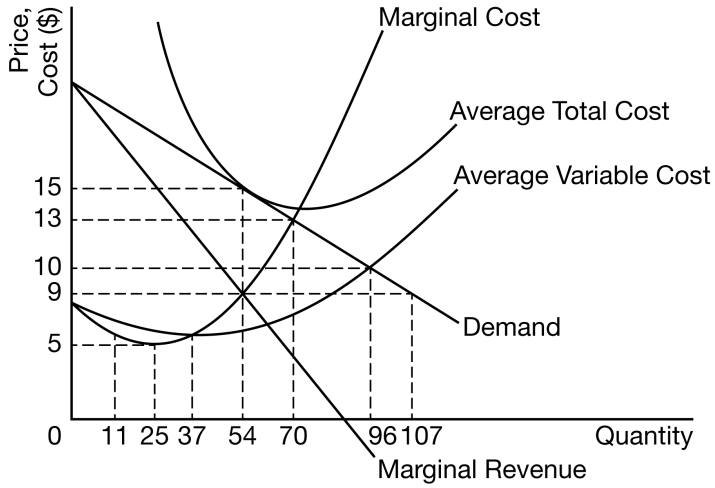
		HotCode	
		Not Advertise	Advertise
NanoWare	Lower Price	$1,000 , $4,200	$3,500 , $4,000
	Maintain Price	$2,000 , $4,600	$3,000 , $4,400

   (f) Does HotCode have a dominant strategy? Explain using numbers from the payoff matrix.

   (g) Identify the Nash equilibrium. Explain why this is a Nash equilibrium using information from the payoff matrix.

   (h) Suppose NanoWare makes a credible commitment to HotCode that if HotCode advertises, then NanoWare will pay HotCode $500. Will this offer result in a Nash equilibrium with different strategies from those identified in part (g)? Explain using numbers from the payoff matrix.

Use the graph provided below to answer parts (a)-(e).



10. TechnoParts, a profit-maximizing firm, has a patent on an electronic component, making it the only producer of that electronic component. The graph above shows TechnoParts' demand, marginal revenue, average total cost, average variable cost, and marginal cost curves.

    (a) Identify the quantity that maximizes TechnoParts' profit. Explain.

    (b) At the quantity identified in part (a), does TechnoParts earn a positive economic profit, a negative economic profit, or zero economic profit? Explain.

    (c) Calculate TechnoParts' total revenue if the firm produces the allocatively efficient quantity. Show your work.

    (d) At a price of $5, will TechnoParts continue to produce or will it shut down in the short run? Explain.

    (e) Assume that at 70 units, the average total cost is $14. If the total property taxes paid by TechnoParts increase by $280, calculate the firm's new average total cost at that output. Show your work.

    Assume that TechnoParts' patent expires. Faradaze, a company with the capability to produce the same electronic component as TechnoParts, intends to enter the market and charge a lower price than TechnoParts for the electronic component. TechnoParts is considering whether to maintain its price or to lower its price to match Faradaze's price. Faradaze is considering whether or not to advertise its entry into the market.
    The matrix below shows the payoffs for each combination of strategies, and both players (TechnoParts and Faradaze) have complete information. The first entry in each cell represents TechnoParts' payoff and the second entry represents Faradaze's payoff. Each player independently and simultaneously chooses its strategy. Use the matrix provided below to answer parts (f)-(h).

		Faradaze	
		Not Advertise	Advertise
TechnoParts	Lower Price	$1,000 , $9,500	$3,000 , $3,500
	Maintain Price	$2,000 , $6,500	$4,000 , $8,500

    (f) Does Faradaze have a dominant strategy? Explain using numbers from the payoff matrix.

    (g) Identify the Nash equilibrium. Explain why this is a Nash equilibrium using information from the payoff matrix.

    (h) Suppose Faradaze makes a credible commitment to TechnoParts that if TechnoParts lowers its price, then Faradaze will pay TechnoParts $750. Will this offer result in a Nash equilibrium with different strategies from those identified in part (g) ? Explain using numbers from the payoff matrix.

Chapter 2

Short Questions

58 Questions

2.1 Perfect Comp Labor Market

19 Questions

1. 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.

2. 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.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. 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.

12. 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.

13. 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.

14. 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.

15. 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.

16. 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.

17. 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.

18. 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.

19. 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.

2.2 Utility Maximization

10 Questions

1. 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.

2. 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.

3. 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.

4. The table below shows the marginal 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.

5. 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 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.

6. 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 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.

7. 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.

8. 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.

9. 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.

10. 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.

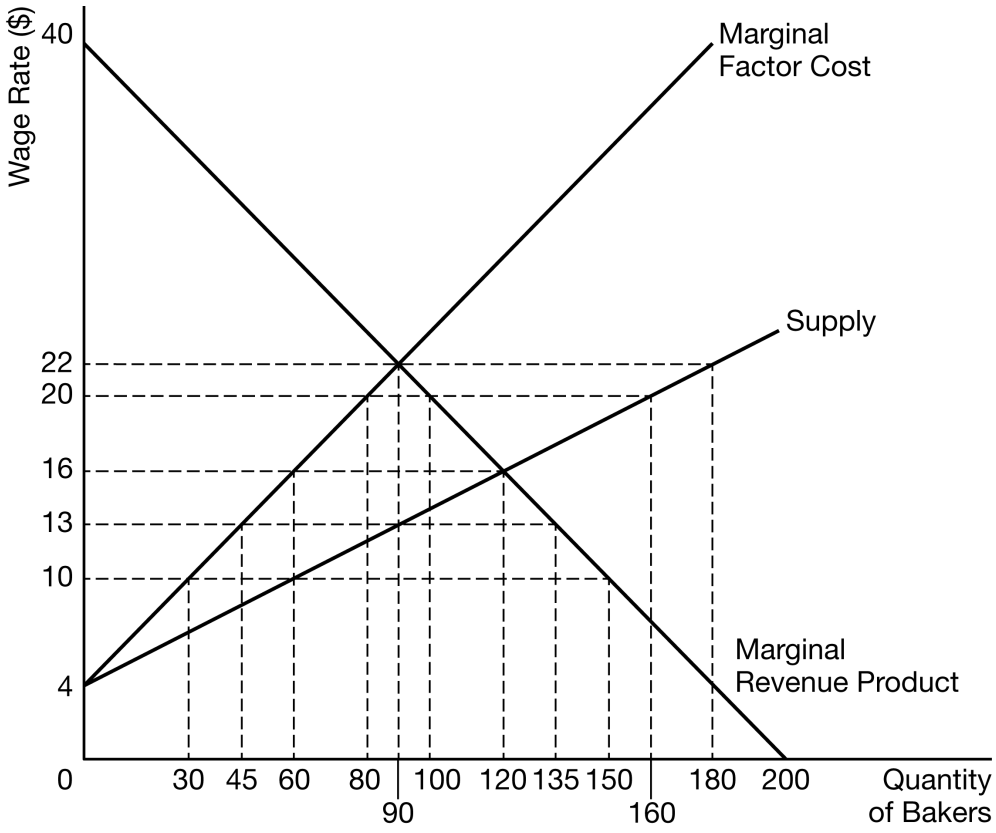
(d) Suppose that pizza is produced in a perfectly competitive market and the price of cheese, an input to the production of pizza, increases. If pizza is a normal good, will the number of slices of pizza that will maximize Zeynep's total benefit increase, decrease, or stay the same? Explain.

(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.

2.3 Monopsonist Labor Market

10 Questions

1. Bobby's Bakehouse is the only bakery in a small remote town, and Bobby's Bakehouse is the only employer of bakers in the area. The graph below shows the market for bakers with the marginal factor (resource) cost curve, the labor supply curve, and the marginal revenue product curve.



(a) If the wage rate is $13, state whether there will be a shortage or a surplus of bakers and calculate its size. Show your work.

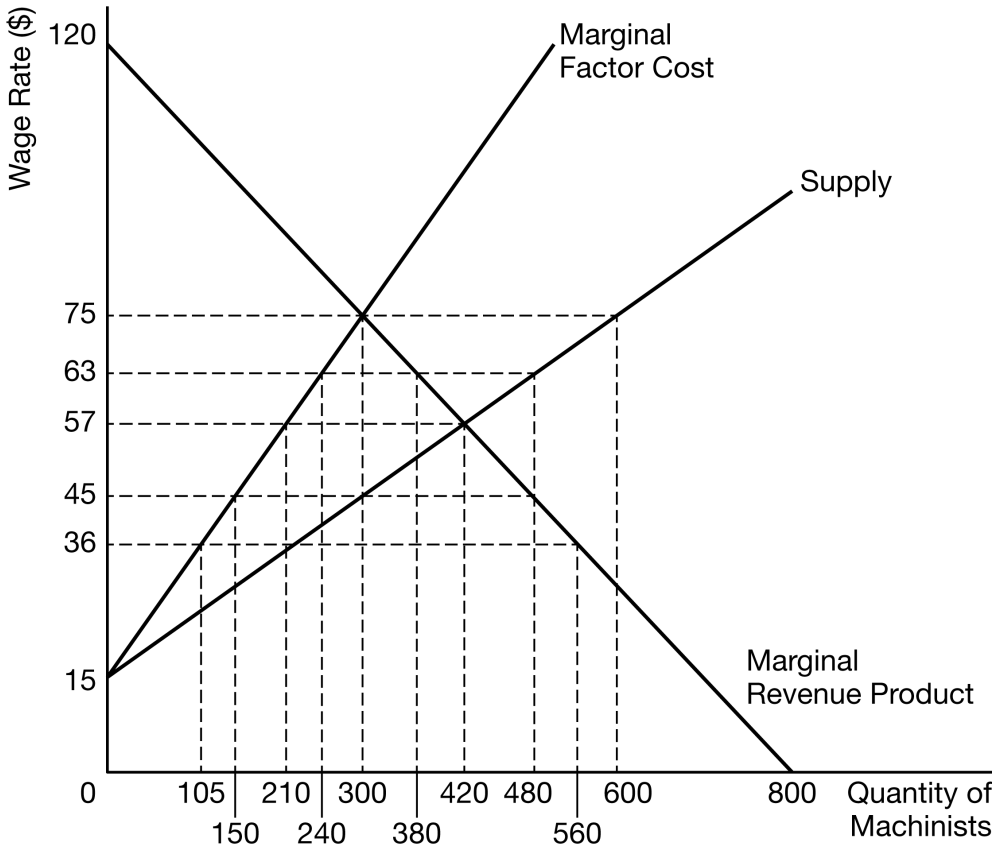
(b) Identify the profit-maximizing number of bakers that Bobby's Bakehouse will hire. Explain using the labeling on the graph.

(c) Identify the profit-maximizing wage rate that Bobby's Bakehouse will pay its bakers. Explain using the labeling on the graph.

(d) If the marginal product of bakers increases, what will happen to the quantity of output produced by Bobby's Bakehouse? Explain.

(e) Assume instead that Bobby's Bakehouse uses both labor and capital in its production of baked goods. The marginal product of the last unit of labor hired is 16 baked goods per hour and the marginal product of the last unit of capital rented is 50 baked goods per hour; the hourly wage rate for labor is $8 and the hourly rental price for capital is $5. To minimize the cost of producing its current level of output, should Bobby's Bakehouse rent more capital, less capital, or the same amount of capital? Explain using marginal analysis.

2. Central Manufacturing Company is the only manufacturing facility in a small remote town, and Central Manufacturing Company is the only employer of machinists in the area. The graph below shows the market for machinists with the marginal factor (resource) cost curve, the labor supply curve, and the marginal revenue product curve.



(a) If the wage rate is $63, state whether there will be a shortage or a surplus of machinists and calculate its size. Show your work.

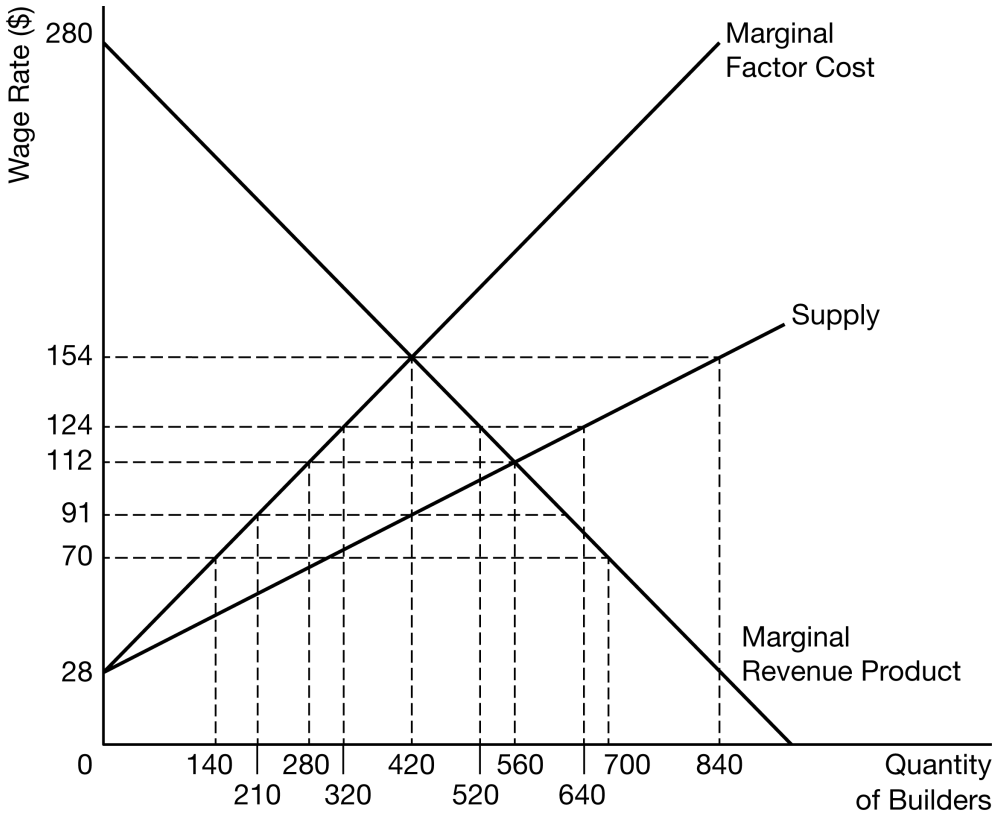
(b) Identify the profit-maximizing number of machinists. Explain using the labeling on the graph.

(c) Identify the profit-maximizing wage rate that Central Manufacturing Company will pay its machinists. Explain using the labeling on the graph.

(d) If the marginal product of machinists increases, what will happen to the quantity of output produced by Central Manufacturing Company? Explain.

(e) Assume instead that Central Manufacturing Company uses both labor and capital in producing widgets. The marginal product of the last unit of labor hired is 120 widgets per day and the marginal product of the last unit of capital rented is 150 widgets per day; the daily wage rate for labor is $40 and the daily rental price for capital is $30. To minimize the cost of producing its current level of output, should Central Manufacturing Company rent more capital, less capital, or the same amount of capital? Explain using marginal analysis.

3. Cornel's Construction is the only builder in a small remote town, and Cornel's Construction is the only employer of builders in the area. The graph below shows the market for builders with the marginal factor (resource) cost curve, the labor supply curve, and the marginal revenue product curve.



(a) If the wage rate is $124, state whether there will be a shortage or a surplus of builders and calculate its size. Show your work.

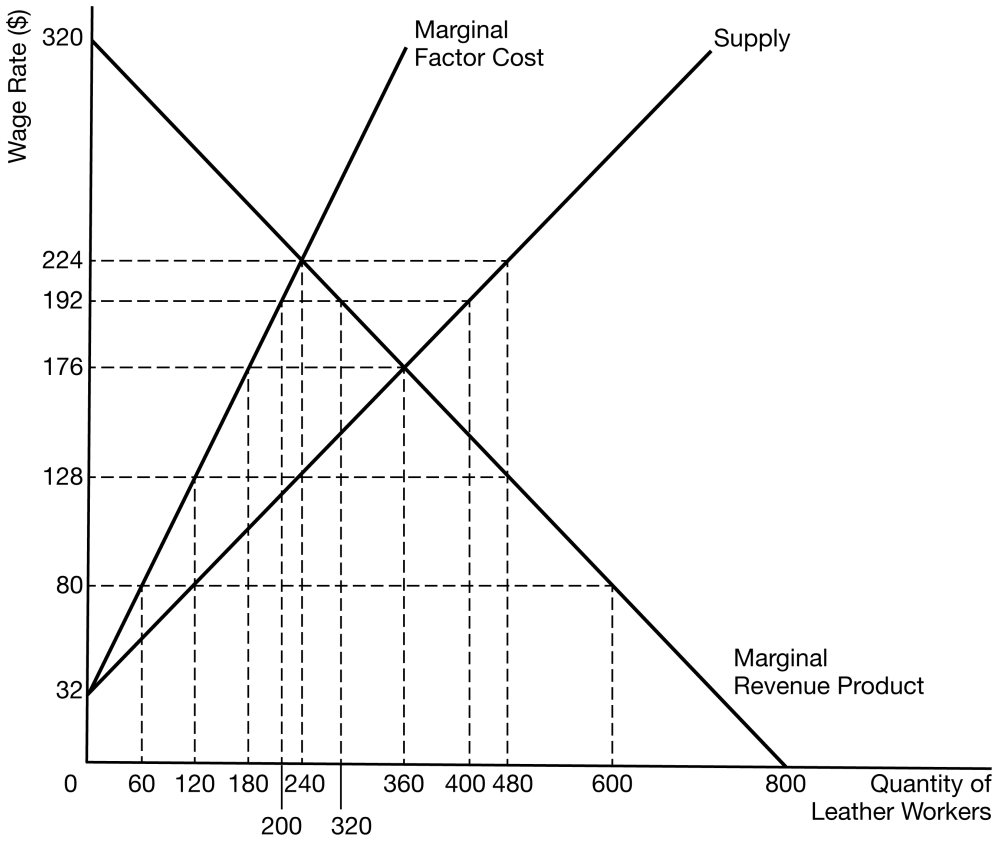
(b) Identify the profit-maximizing number of builders that Cornel's Construction will hire. Explain using the labeling on the graph.

(c) Identify the profit-maximizing wage rate that Cornel's Construction will pay its builders. Explain using the labeling on the graph.

(d) If the marginal product of builders increases, what will happen to the quantity of services provided by Cornel's Construction? Explain.

(e) Assume instead that Cornel's Construction uses both labor and capital in providing its services. The marginal product of the last unit of labor hired is 15 projects per hour and the marginal product of the last unit of capital rented is 10 projects per hour; the hourly wage rate for labor is $150 and the hourly rental price for capital is $50. To minimize the cost of providing its current level of output, should Cornel's Construction rent more capital, less capital, or the same amount of capital? Explain using marginal analysis.

4. Henri's Handbags is the only leather bags shop in a small remote town, and Henri's Handbags is the only employer of leather workers in the area. The graph below shows the market for leather workers with the marginal factor (resource) cost curve, the labor supply curve, and the marginal revenue product curve.



(a) If the wage rate is $192, state whether there will be a shortage or a surplus of leather workers and calculate its size. Show your work.

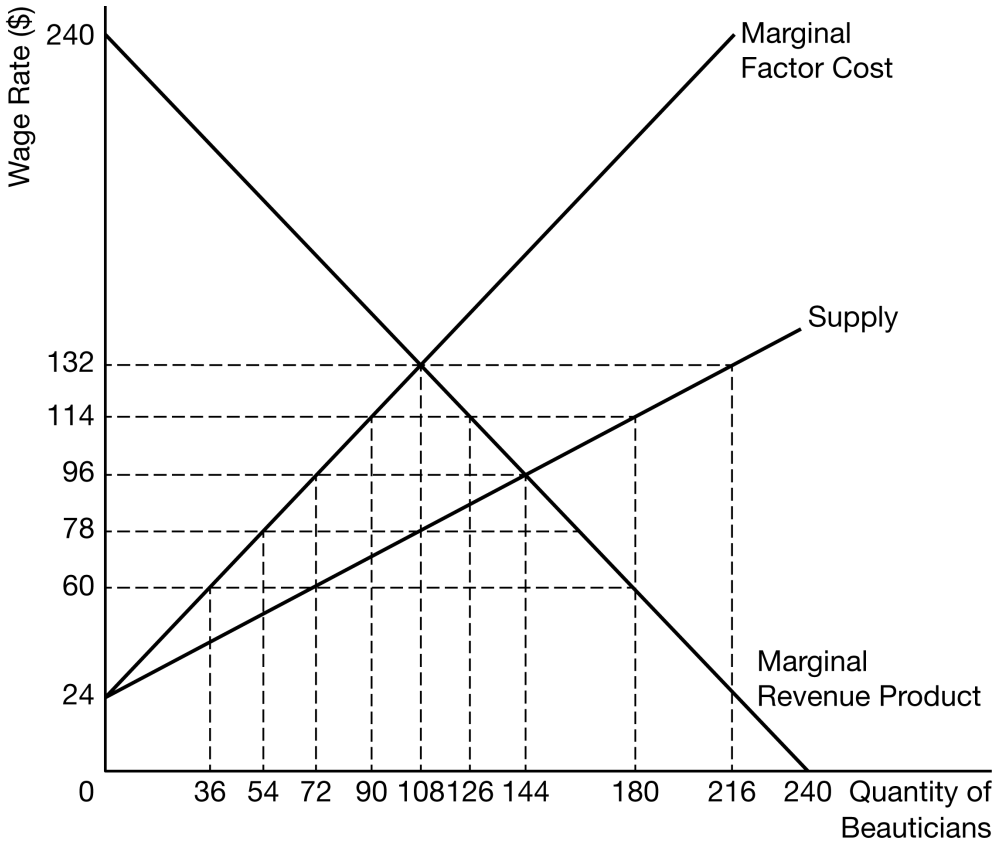
(b) Identify the profit-maximizing number of leather workers that Henri's Handbags will hire. Explain using the labeling on the graph.

(c) Identify the profit-maximizing wage rate that Henri's Handbags will pay its leather workers. Explain using the labeling on the graph.

(d) Assume that the market for leather workers becomes perfectly competitive. What wage rate would Henri's Handbags pay its leather workers if it were a perfectly competitive firm? Explain using labeling on the graph.

(e) Assume instead that Henri's Handbags uses both labor and capital in its production of handbags. The marginal product of the last unit of labor hired is 180 handbags per hour and the marginal product of the last unit of capital rented is 160 handbags per hour; the hourly wage rate for labor is $60 and the hourly rental price for capital is $20. To minimize the cost of producing its current level of output, should Henri's Handbags hire more leather workers, fewer leather workers, or the same number of leather workers? Explain using marginal analysis.

5. Karen's Cuts is the only beauty salon in a small remote town, and Karen's Cuts is the only employer of beauticians in the area. The graph below shows the market for beauticians with the marginal factor (resource) cost curve, the labor supply curve, and the marginal revenue product curve.



(a) Identify the profit-maximizing number of beauticians that Karen's Cuts will hire. Explain using the labeling on the graph.

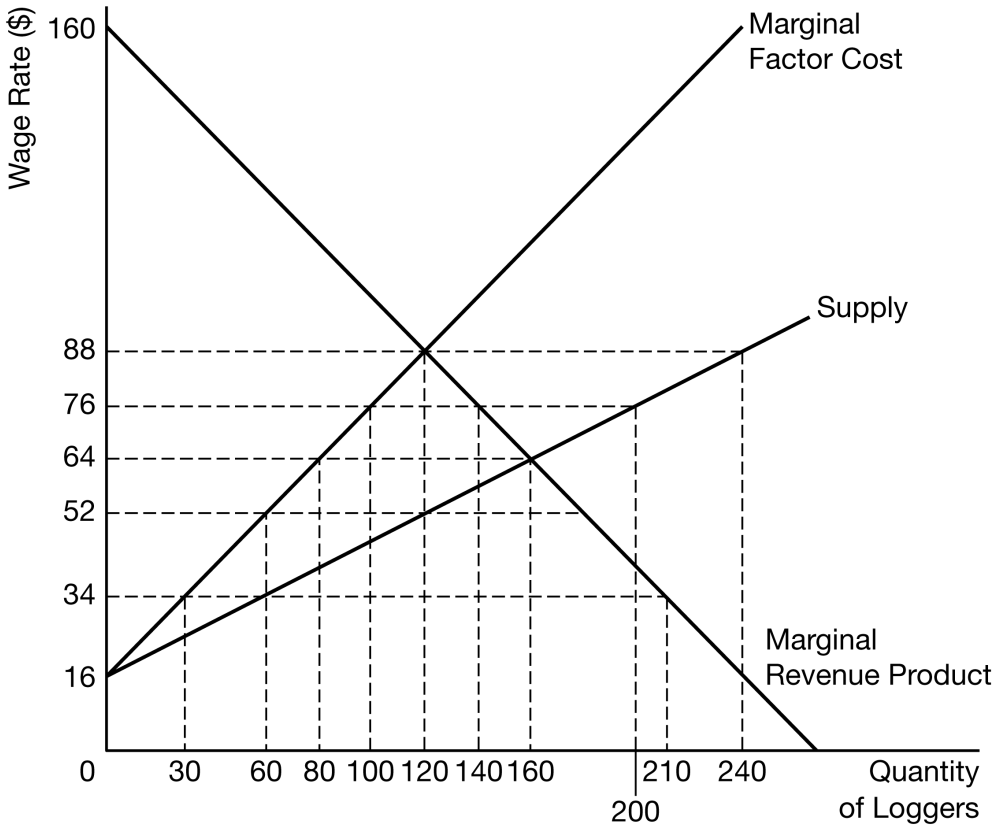
(b) Identify the profit-maximizing wage rate that Karen's Cuts will pay its beauticians. Explain using the labeling on the graph.

(c) If the wage rate is $114, state whether there will be a shortage or a surplus of beauticians and calculate its size. Show your work.

(d) Assume that the market for beauticians becomes perfectly competitive. What wage rate would Karen's Cuts pay its beauticians if it were a perfectly competitive firm? Explain using labeling on the graph.

(e) Assume instead that Karen's Cuts uses both labor and capital in providing its services. The marginal product of the last unit of labor hired is 30 cuts per day and the marginal product of the last unit of capital rented is 20 cuts per day; the daily wage rate for labor is $60 and the daily rental price for capital is $20. To minimize the cost of providing its current level of services, should Karen's Cuts hire more beauticians, fewer beauticians, or the same number of beauticians? Explain using marginal analysis.

6. Larry's Logging is the only logging company in a small remote town, and Larry's Logging is the only employer of loggers in the area. The graph below shows the market for loggers with the marginal factor (resource) cost curve, the labor supply curve, and the marginal revenue product curve.



(a) If the wage rate is $34, state whether there will be a shortage or a surplus of loggers and calculate its size. Show your work.

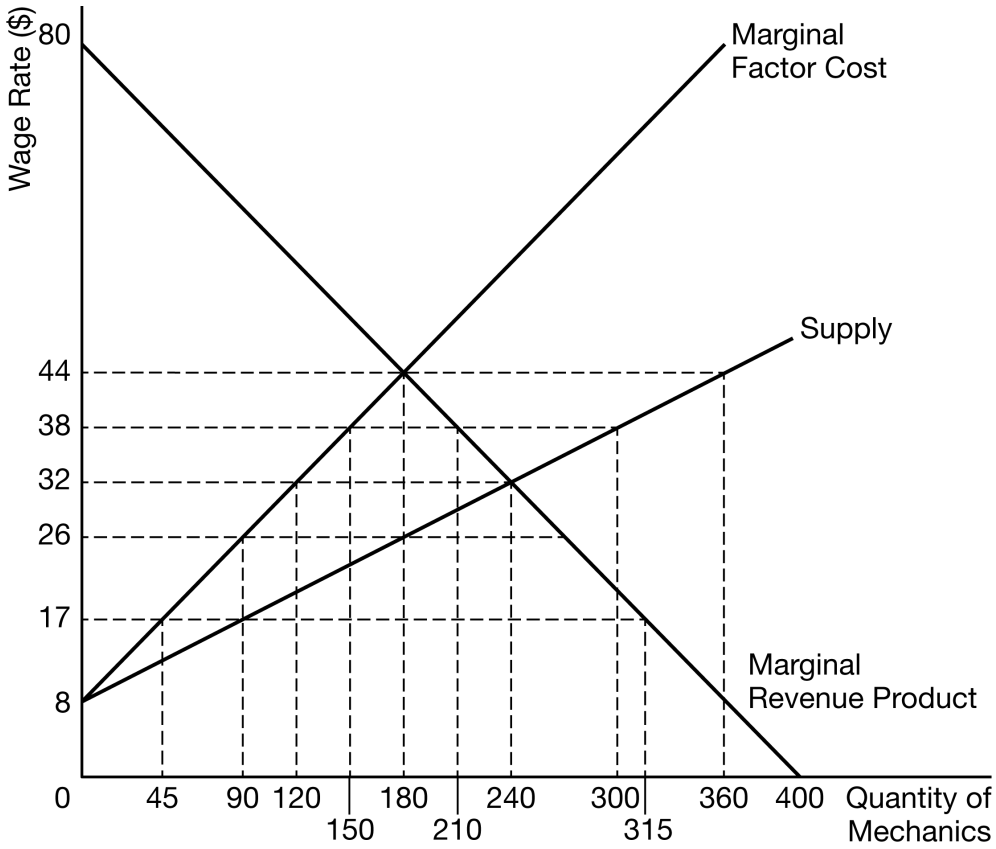
(b) Identify the profit-maximizing number of loggers that Larry's Logging will hire. Explain using the labeling on the graph.

(c) Identify the profit-maximizing wage rate that Larry's Logging will pay its loggers. Explain using the labeling on the graph.

(d) Assume that the market for loggers becomes perfectly competitive. What wage rate would Larry's Logging pay its loggers if it were a perfectly competitive firm? Explain using the labeling on the graph.

(e) Assume instead that Larry's Logging uses both labor and capital in its production of logs. The marginal product of the last unit of labor hired is 150 logs per hour and the marginal product of the last unit of capital rented is 200 logs per hour; the hourly wage rate for labor is $30 and the hourly rental price for capital is $50. To minimize the cost of producing its current level of output, should Larry's Logging hire more loggers, fewer loggers, or the same number of loggers? Explain using marginal analysis.

7. Molly's Motorcycles is the only motorcycle repair shop in a small remote town, and Molly's Motorcycles is the only employer of mechanics in the area. The graph below shows the market for mechanics with the marginal factor (resource) cost curve, the labor supply curve, and the marginal revenue product curve.



(a) Identify the profit-maximizing number of mechanics that Molly's Motorcycles will hire. Explain using the labeling on the graph.

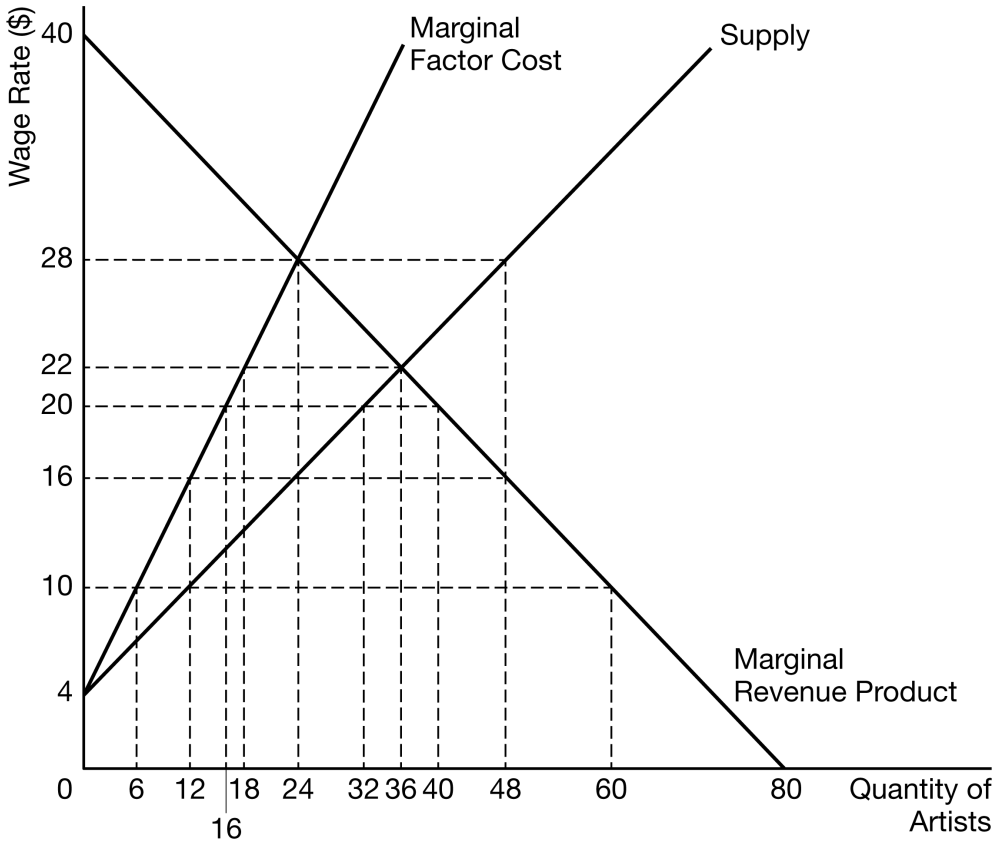
(b) Identify the profit-maximizing wage rate that Molly's Motorcycles will pay its mechanics. Explain using the labeling on the graph.

(c) If the wage rate is $38, state whether there will be a shortage or a surplus of mechanics and calculate its size. Show your work.

(d) If the marginal product of mechanics decreases, what will happen to the quantity of services provided by Molly's Motorcycles? Explain.

(e) Assume instead that Molly's Motorcycles uses both labor and capital in providing its services. The marginal product of the last unit of labor hired is 100 repairs per day and the marginal product of the last unit of capital rented is 60 repairs per day; the daily wage rate for labor is $20 and the daily rental price for capital is $30. To minimize the cost of providing its current level of service, should Molly's Motorcycles rent more capital, less capital, or the same amount of capital? Explain using marginal analysis.

8. Tandy's Art is the only art studio and workshop in a small remote town, and Tandy's Art is the only employer of artists in the area. The graph below shows the market for artists with the marginal factor (resource) cost curve, the labor supply curve, and the marginal revenue product curve.



(a) Identify the profit-maximizing number of artists that Tandy's Art will hire. Explain using the labeling on the graph.

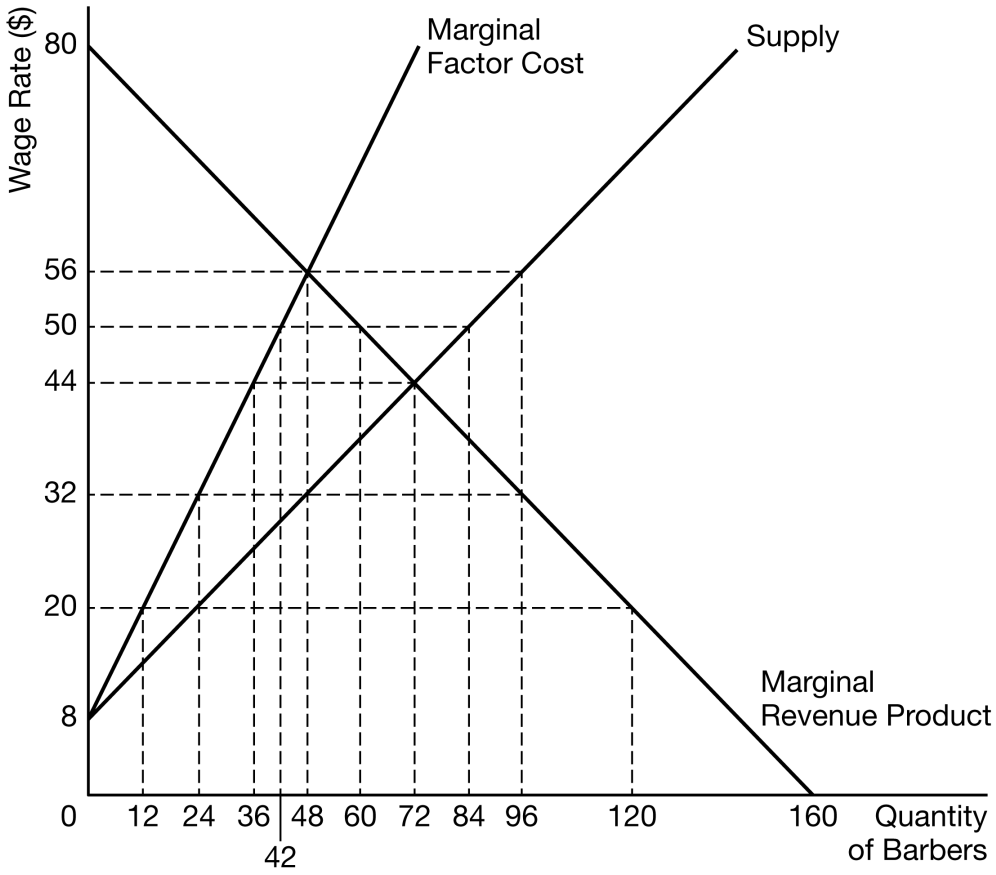
(b) Identify the profit-maximizing wage rate that Tandy's Art will pay its artists. Explain using the labeling on the graph.

(c) If the wage rate is $10, state whether there will be a shortage or a surplus of artists and calculate its size. Show your work.

(d) Assume that the market for artists becomes perfectly competitive. What wage rate would Tandy's Art pay its artists if it were a perfectly competitive firm? Explain using labeling on the graph.

(e) Assume instead that Tandy's Art uses both labor and capital in its production of artwork. The marginal product of the last unit of labor hired is 90 pieces of artwork per day and the marginal product of the last unit of capital rented is 80 pieces of artwork per day; the daily wage rate for labor is $10 and the daily rental price for capital is $20. To minimize the cost of providing its current level of output, should Tandy's Art hire more artists, fewer artists, or the same number of artists? Explain using marginal analysis.

9. Tom's Trims is the only barber shop in a small remote town, and Tom's Trims is the only employer of barbers in the area. The graph below shows the market for barbers with the marginal factor (resource) cost curve, the labor supply curve, and the marginal revenue product curve.



(a) If the wage rate is $20, state whether there will be a shortage or a surplus of barbers and calculate its size. Show your work.

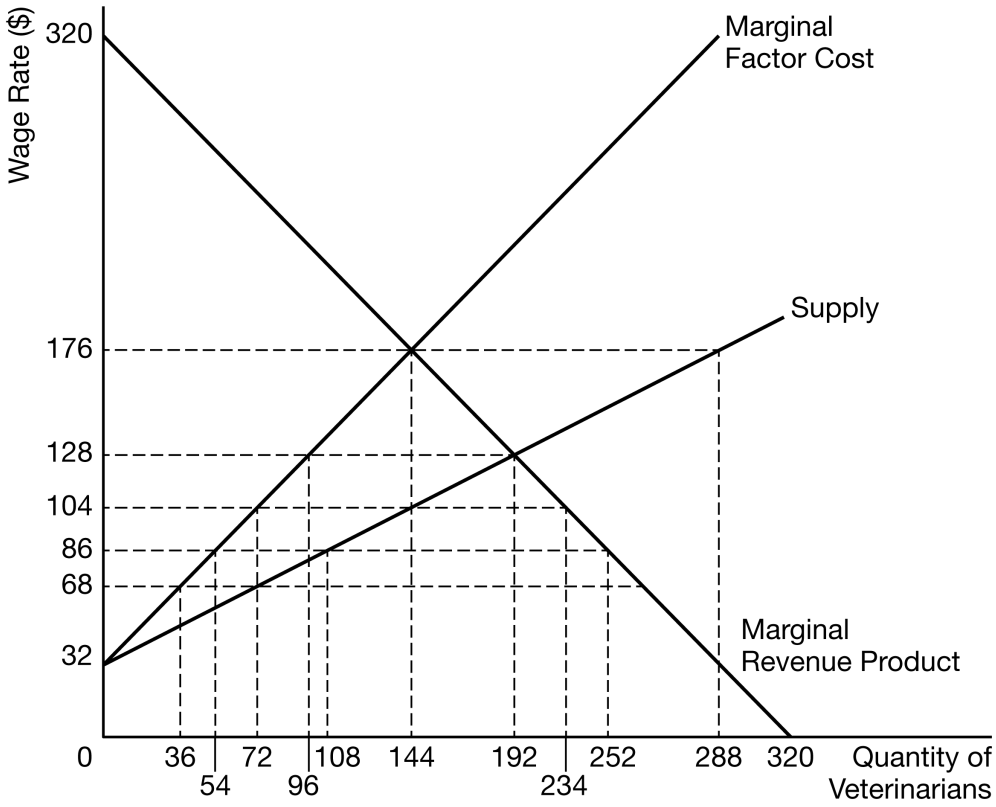
(b) Identify the profit-maximizing number of barbers that Tom's Trims will hire. Explain using the labeling on the graph.

(c) Identify the profit-maximizing wage rate that Tom's Trims will pay its barbers. Explain using the labeling on the graph.

(d) Assume that the market for barbers becomes perfectly competitive. What wage rate would Tom's Trims pay its barbers if it were a perfectly competitive firm? Explain using labeling on the graph.

(e) Assume instead that Tom's Trims uses both labor and capital in providing its services. The marginal product of the last unit of labor hired is 80 cuts per day and the marginal product of the last unit of capital rented is 120 cuts per day; the daily wage rate for labor is $20 and the daily rental price for capital is $40. To minimize the cost of producing its current level of output, should Tom's Trims hire more barbers, fewer barbers, or the same number of barbers? Explain using marginal analysis.

10. Vijay's Veterinary is the only animal care facility in a small remote town, and Vijay's Veterinary is the only employer of veterinarians in the area. The graph below shows the market for veterinarians with the marginal factor (resource) cost curve, the labor supply curve, and the marginal revenue product curve.



(a) Identify the profit-maximizing number of veterinarians that Vijay's Veterinary will hire. Explain using the labeling on the graph.

(b) Identify the profit-maximizing wage rate that Vijay's Veterinary will pay its veterinarians. Explain using the labeling on the graph.

(c) If the wage rate is $86, state whether there will be a shortage or a surplus of veterinarians and calculate its size. Show your work.

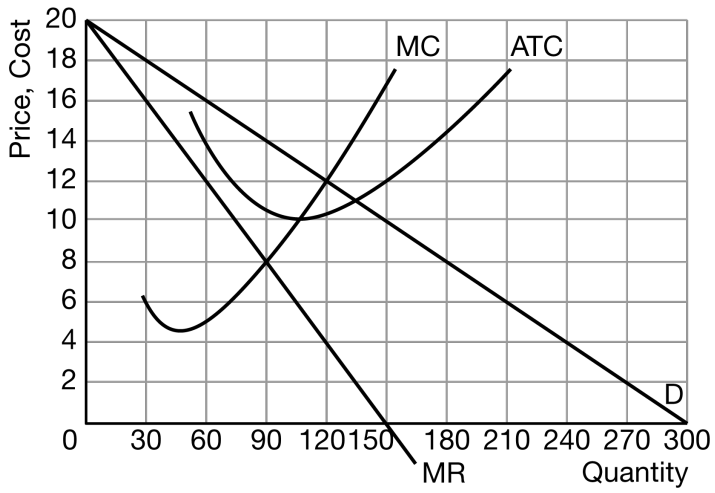
(d) If the marginal product of veterinarians decreases, what will happen to the quantity of services provided by Vijay's Veterinary? Explain.

(e) Assume instead that Vijay's Veterinary uses both labor and capital in providing its services. The marginal product of the last unit of labor hired is 50 patients per day and the marginal product of the last unit of capital rented is 10 patients per day; the daily wage rate for labor is $100 and the daily rental price for capital is $40. To minimize the cost of providing its current level of service, should Vijay's Veterinary rent more capital, less capital, or the same amount of capital? Explain using marginal analysis.

2.4 Monopolistic Competition

19 Questions

1. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) What will happen to total revenue if the firm raises the price from $12 to $16? Explain.

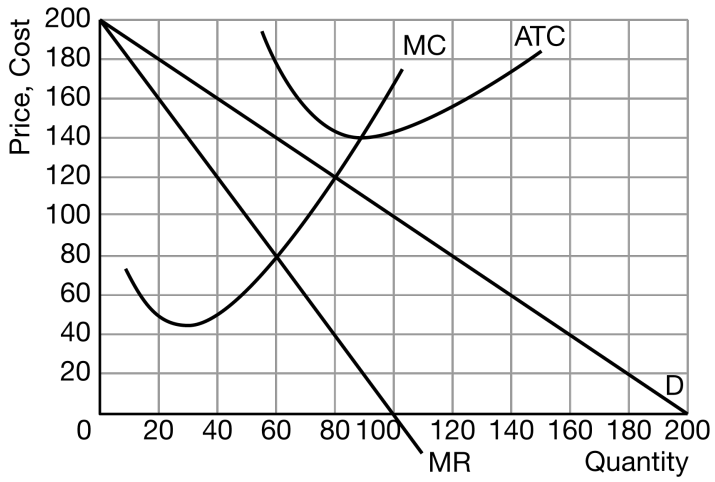
(b) At 120 units, is the firm producing at the allocatively efficient quantity? Explain.

(c) If the firm produces 90 units, will the firm's economic profit be positive, negative, or zero? Explain.

(d) Use the relationship between the marginal cost curve and the average total cost curve to explain why the average total cost curve is decreasing at 60 units.

(e) Calculate the consumer surplus if the firm charges the profit-maximizing price. Show your work.

2. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) Calculate the total revenue of producing 40 units. Show your work.

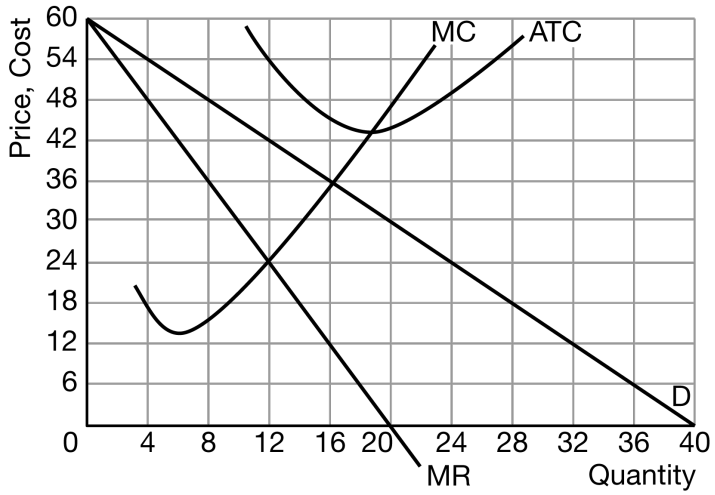
(b) For quantities between 160 and 180 units, is the demand curve elastic, inelastic, or unit elastic? Explain.

(c) Assume that this firm is currently charging a price of $100. In order to maximize its profit, should the firm increase its price, decrease its price, or keep its price the same? Explain.

(d) At a quantity of 20 units, does this firm have increasing marginal returns or diminishing marginal returns? Explain.

(e) Identify the firm's allocatively efficient quantity, and explain how you determined it.

3. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D) , marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) Assume the firm produces 16 units. Will the firm's economic profit be positive, negative, or zero? Explain.

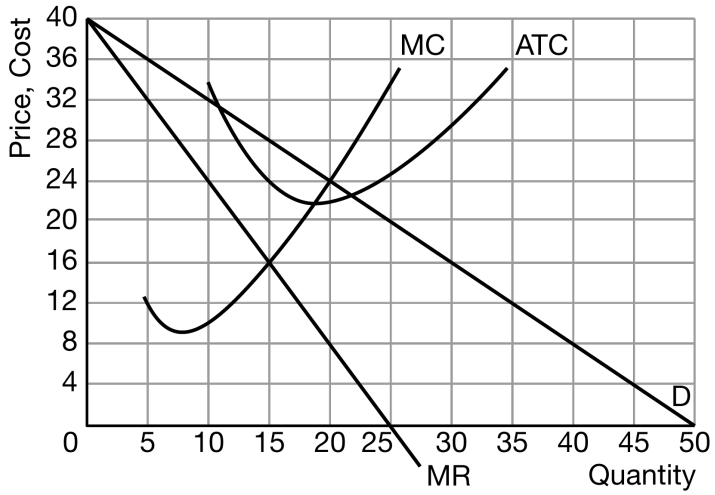
(b) If the firm charges $36, should this firm increase its price, decrease its price, or keep the price at $36 in order to maximize its total revenue? Explain.

(c) If the firm increases its price from $36 to $42, does the deadweight loss increase, decrease, or remain unchanged? Explain.

(d) Assuming the firm produces a quantity greater than zero, identify the firm's profit-maximizing quantity and price, and explain how you determined each.

(e) Calculate the total cost of producing the profit-maximizing quantity identified in part (c). Show your work.

4. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) Assume the firm produces 20 units. Will the firm's economic profit be positive, negative, or zero? Explain.

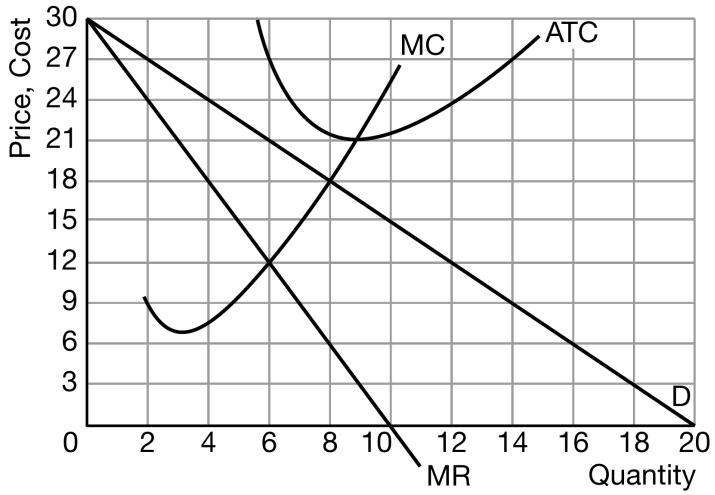
(b) If the firm charges $12, should this firm increase its price, decrease its price, or keep the price at $12 in order to maximize its total revenue? Explain.

(c) If the firm decreases its price from $32 to $28, does the deadweight loss increase, decrease, or remain unchanged? Explain.

(d) Identify the profit-maximizing quantity and price, and explain how you determined each.

(e) Calculate the total cost of producing the profit-maximizing quantity identified in part (d). Show your work.

5. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) Assume the firm produces 8 units. Will the firm's economic profit be positive, negative, or zero? Explain.

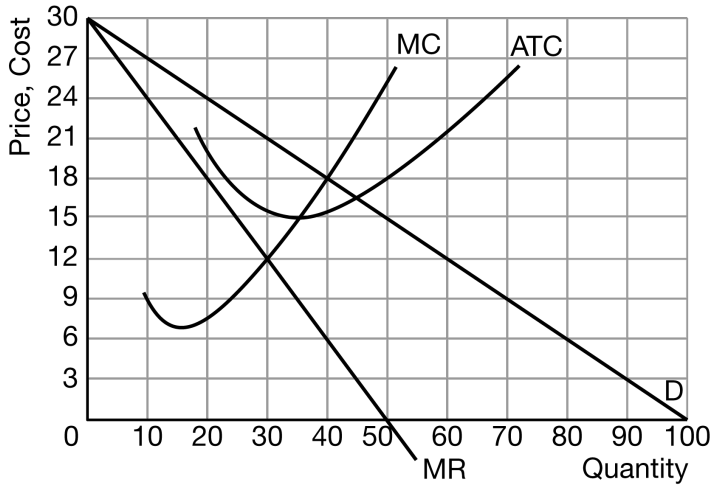
(b) If the firm charges $18, should this firm increase its price, decrease its price, or keep the price at $18 in order to maximize its total revenue? Explain.

(c) If the firm increases its price from $21 to $24, does the deadweight loss increase, decrease, or remain unchanged? Explain.

(d) Assuming the firm produces a quantity greater than zero, identify the profit-maximizing quantity and price, and explain how you determined each.

(e) Calculate the total cost of producing the profit-maximizing quantity identified in part (d). Show your work.

6. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) At what quantity is the demand for this product unit elastic? Explain.

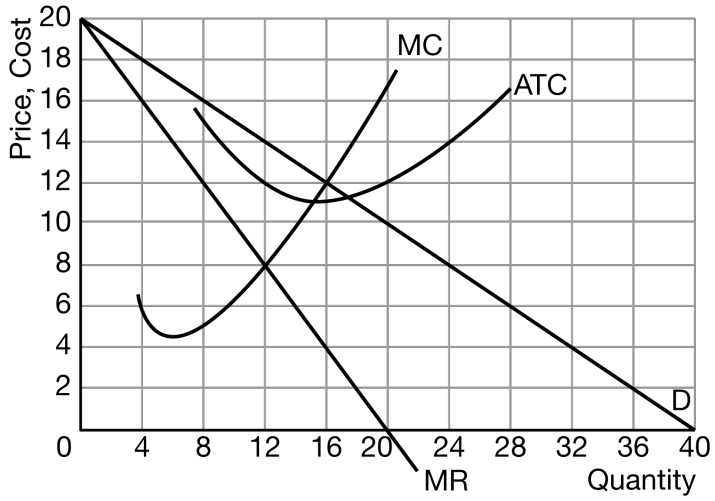
(b) Use the relationship between the marginal cost curve and the average total cost curve to explain why the average total cost curve is increasing at 40 units.

(c) If the firm maximizes profit, identify the profit-maximizing quantity and price, and explain how you determined each.

(d) Calculate the deadweight loss at the profit-maximizing quantity identified in part (c). Show your work.

(e) Assume fixed cost increases by $6. Will the profit-maximizing quantity increase, decrease, or stay the same in the short run? Explain.

7. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) Calculate the total revenue of producing 8 units. Show your work.

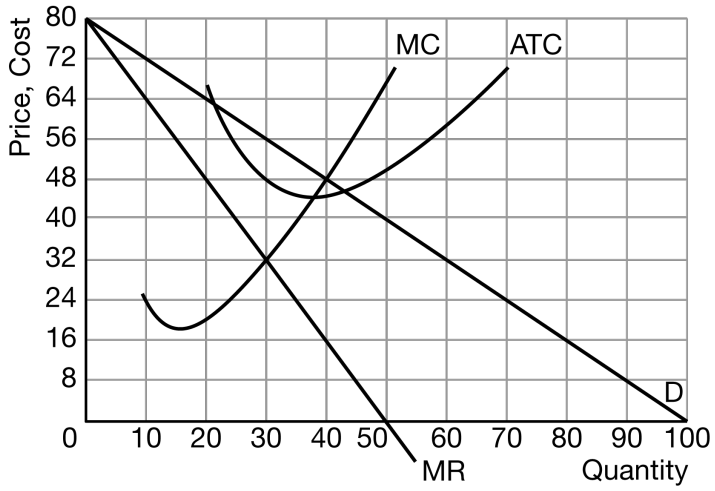
(b) For quantities between 8 and 12 units, is the demand curve elastic, inelastic, or unit elastic? Explain.

(c) Assume that this firm is currently charging a price of $14. In order to maximize its profit, should the firm increase its price, decrease its price, or keep its price the same? Explain.

(d) At a quantity of 8 units, does this firm have increasing marginal returns or diminishing marginal returns? Explain.

(e) Identify the firm's allocatively efficient quantity, and explain how you determined it.

8. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) Assume the firm produces 40 units. Will the firm's economic profit be positive, negative, or zero? Explain.

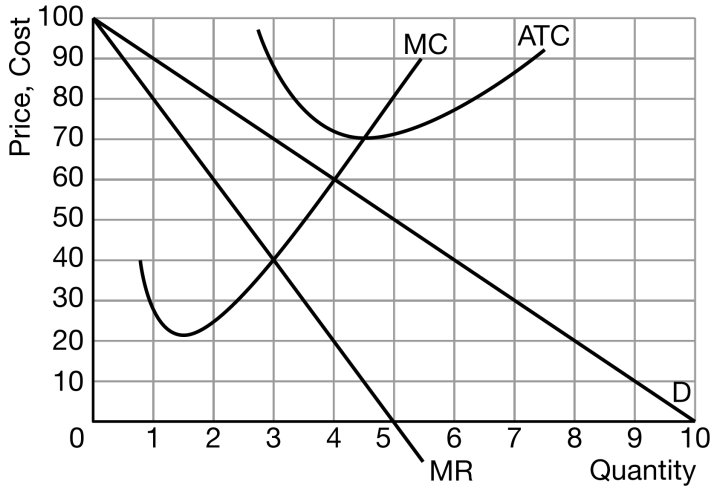
(b) If the firm charges $32, should this firm increase its price, decrease its price, or keep the price at $32 in order to maximize its total revenue? Explain.

(c) If the firm decreases its price from $72 to $64, does the deadweight loss increase, decrease, or remain unchanged? Explain.

(d) Identify the firm's profit-maximizing quantity and price, and explain how you determined each.

(e) Calculate the total cost of producing the profit-maximizing quantity identified in part (d). Show your work.

9. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) Calculate the total revenue of producing 2 units. Show your work.

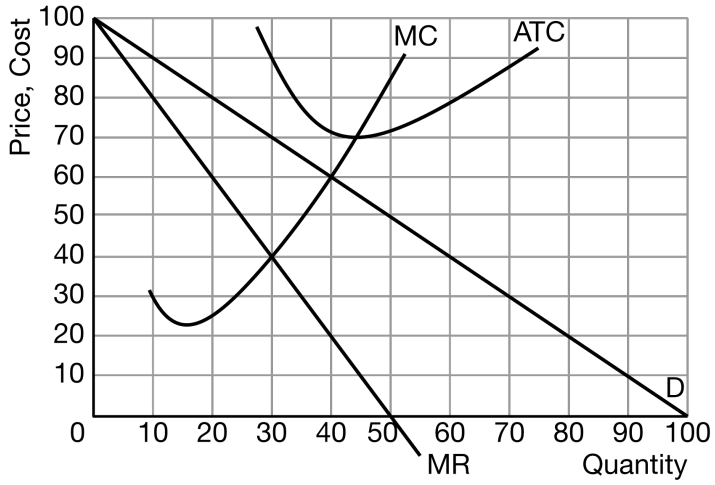
(b) For quantities between 6 and 8 units, is the demand curve elastic, inelastic, or unit elastic? Explain.

(c) Assume that this firm is currently charging a price of $80. In order to maximize its profit, should the firm increase its price, decrease its price, or keep its price the same? Explain.

(d) At a quantity of 1 unit, does this firm have increasing marginal returns or diminishing marginal returns? Explain.

(e) Identify the firm's allocatively efficient quantity, and explain how you determined it.

10. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) For prices between \$80 and \$70, is the demand curve elastic, inelastic, or unit elastic? Explain.

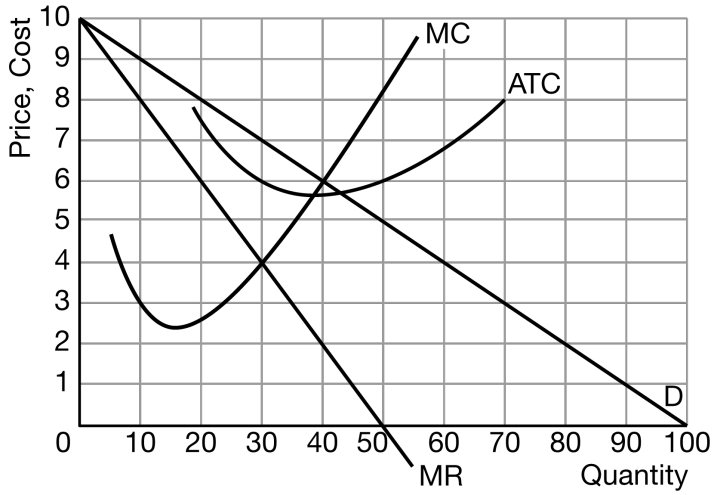
(b) To produce the allocatively efficient quantity, how many units of output would the firm produce? Explain

(c) To maximize total revenue, how many units of output would the firm produce? Explain.

(d) Assuming the firm produces a quantity greater than zero, identify the firm's profit-maximizing quantity. Explain using marginal analysis.

(e) Calculate the firm's economic profit at the profit-maximizing quantity identified in part (d). Show your work.

11. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) Calculate the total revenue of producing 30 units. Show your work.

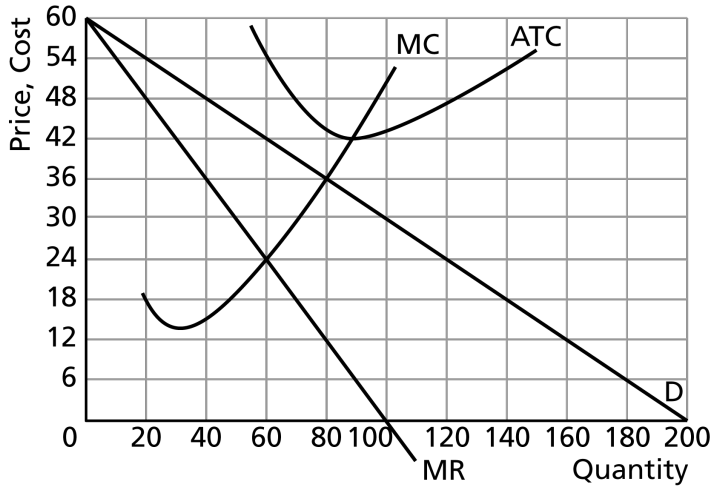
(b) For quantities between 30 and 40 units, is the demand curve elastic, inelastic, or unit elastic? Explain.

(c) Assume that this firm is currently charging a price of $6. In order to maximize its profit, should the firm increase its price, decrease its price, or keep its price the same? Explain.

(d) At a quantity of 50 units, does this firm have increasing marginal returns or diminishing marginal returns? Explain.

(e) Identify the firm's allocatively efficient quantity, and explain how you determined it.

12. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) At what quantity is the demand for this product unit elastic? Explain.

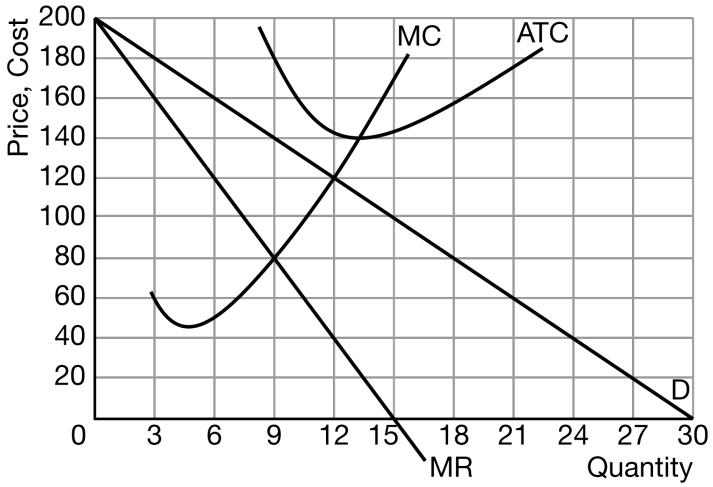
(b) Use the relationship between the marginal cost curve and the average total cost curve to explain why the average total cost curve is decreasing at 80 units.

(c) If the firm maximizes profit, identify the profit-maximizing quantity and price, and explain how you determined each.

(d) Calculate the deadweight loss at the profit-maximizing quantity identified in part (c). Show your work.

(e) Assume fixed cost decreases by $12. Will the profit-maximizing quantity increase, decrease, or stay the same in the short run? Explain.

13. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) For prices between $140 and $120, is the demand curve elastic, inelastic, or unit elastic? Explain.

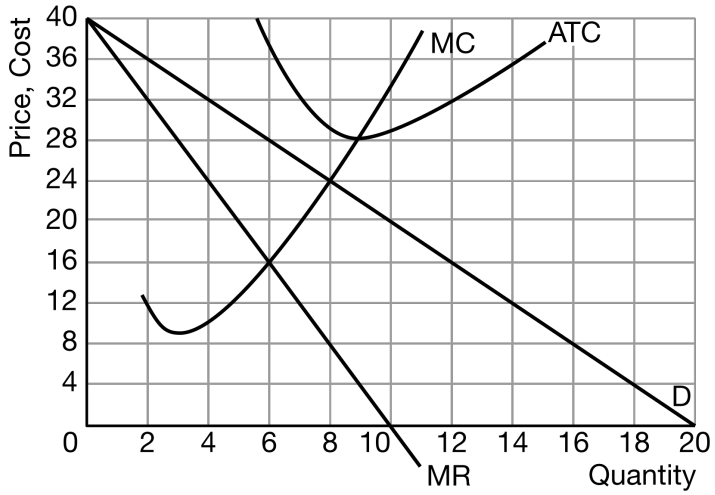
(b) To produce the allocatively efficient quantity, how many units of output would the firm produce? Explain.

(c) To maximize total revenue, how many units of output would the firm produce? Explain.

(d) Assuming the firm produces a quantity greater than zero, identify the firm's profit-maximizing quantity. Explain using marginal analysis.

(e) Calculate the firm's economic profit at the profit-maximizing quantity identified in part (d). Show your work.

14. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) What will happen to total revenue if the firm raises the price from $12 to $16? Explain.

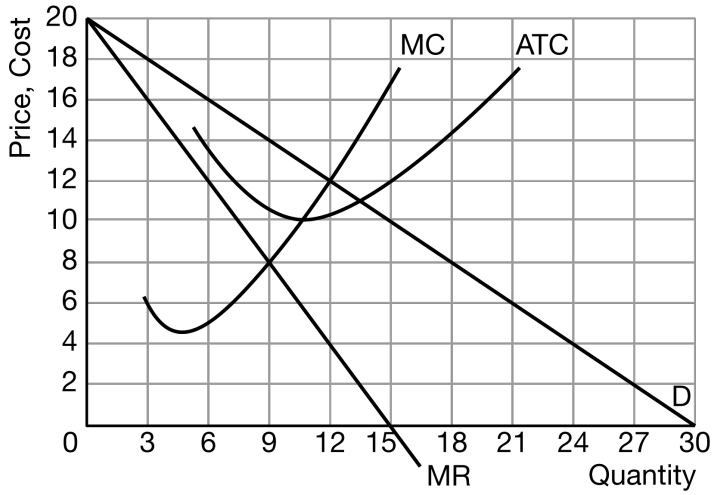
(b) At 10 units, is the firm producing at the allocatively efficient quantity? Explain.

(c) If the firm produces 8 units, will the firm's economic profit be positive, negative, or zero? Explain.

(d) Use the relationship between the marginal cost curve and the average total cost curve to explain why the average total cost curve is increasing at 10 units.

(e) Calculate the consumer surplus if the firm charges the profit-maximizing price. Show your work.

15. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) At what quantity is the demand for this product unit elastic? Explain.

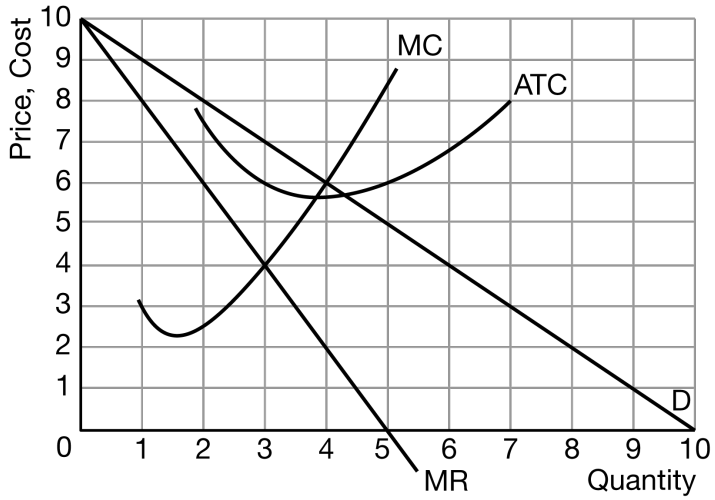
(b) Use the relationship between the marginal cost curve and the average total cost curve to explain why the average total cost curve is increasing at 12 units.

(c) If the firm maximizes profit, identify the profit-maximizing quantity and price, and explain how you determined each.

(d) Calculate the deadweight loss at the profit-maximizing quantity identified in part (c). Show your work.

(e) Assume fixed cost increases by $4. Will the profit-maximizing quantity increase, decrease, or stay the same in the short run? Explain.

16. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) For prices between \$3 and \$2, is the demand curve elastic, inelastic, or unit elastic? Explain.

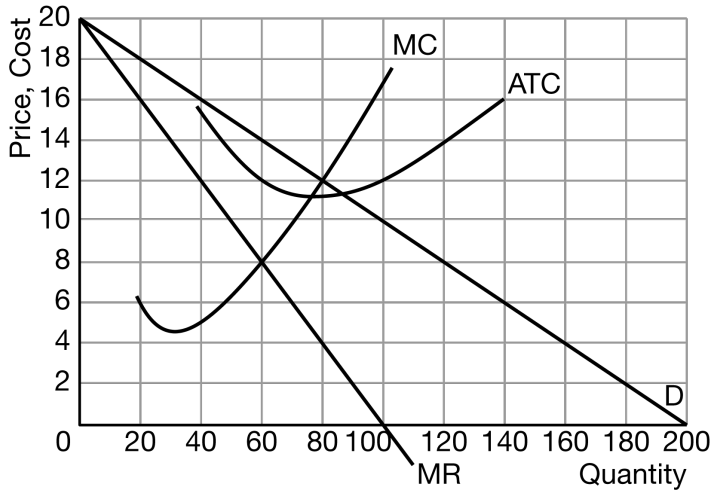
(b) To produce the allocatively efficient quantity, how many units of output would the firm produce? Explain.

(c) To maximize total revenue, how many units of output would the firm produce? Explain.

(d) Identify the firm's profit-maximizing quantity. Explain using marginal analysis.

(e) Calculate the firm's economic profit at the profit-maximizing quantity identified in part (d). Show your work.

17. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) For prices between \$8 and \$6, is the demand curve elastic, inelastic, or unit elastic? Explain.

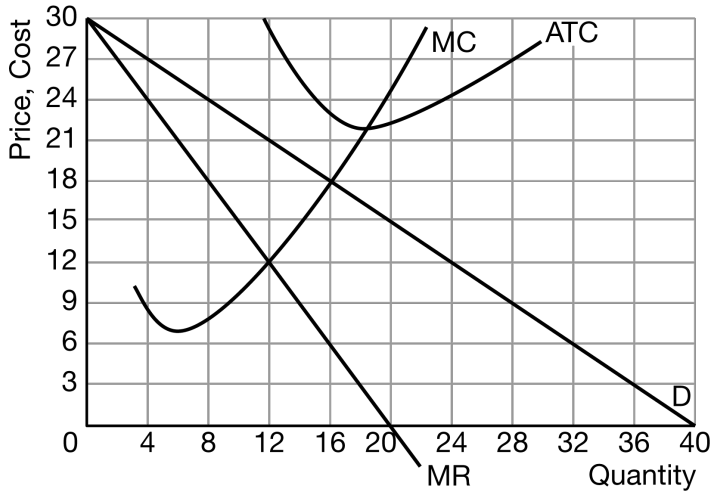
(b) To produce the allocatively efficient quantity, how many units of output would the firm produce? Explain.

(c) To maximize total revenue, how many units of output would the firm produce? Explain.

(d) Identify the firm's profit-maximizing quantity. Explain using marginal analysis.

(e) Calculate the firm's economic profit at the profit-maximizing quantity identified in part (d). Show your work.

18. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) What will happen to total revenue if the firm raises the price from $9 to $12? Explain.

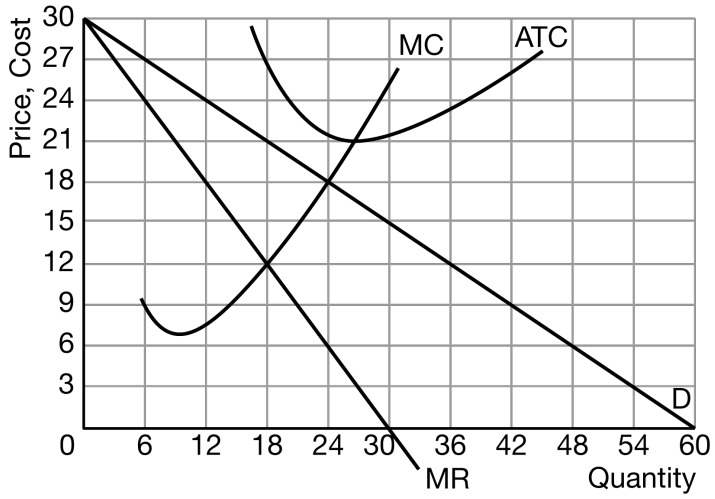
(b) At 16 units, is the firm producing at the allocatively efficient quantity? Explain.

(c) If the firm produces 12 units, will the firm's economic profit be positive, negative, or zero? Explain.

(d) Use the relationship between the marginal cost curve and the average total cost curve to explain why the average total cost curve is increasing at 20 units.

(e) Calculate the consumer surplus if the firm charges the profit-maximizing price. Show your work.

19. Use the following graph to answer parts (a)-(e). Prices and costs are in dollars.



The graph above shows the demand (D), marginal revenue (MR), marginal cost (MC), and average total cost (ATC) curves for one of many profit-maximizing firms operating in the short run in an industry in which there are no barriers to entry. Each firm sells a similar but not identical product.

(a) At what quantity is the demand for this product unit elastic? Explain.

(b) Use the relationship between the marginal cost curve and the average total cost curve to explain why the average total cost curve is decreasing at 18 units.

(c) If the firm maximizes profit, identify the profit-maximizing quantity and price, and explain how you determined each.

(d) Calculate the deadweight loss at the profit-maximizing quantity identified in part (c). Show your work.

(e) Assume fixed cost decreases by $9. Will the profit-maximizing quantity increase, decrease, or stay the same in the short run? Explain.