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**ECON 102 Boyle – Final Exam – New Material – Practice Exam Solutions**

1. B – Please note that these first four problems are likely much easier than problems you will see on the exam. These problems are intended to be a warm up and to make sure you can correctly identify cost curves if they are not labeled.
2. D
3. C
4. A
5. A – Constant cost industry
6. D – It is the MC curve at and above the intersection with the average variable cost curve. This is because firms will shut down if price is below average variable cost.
7. D – AFC. AFC is the only curve that is not U-shaped.
8. D – All of the above
9. D – Price will increase, marginal cost will decrease, and total profit will increase. The firm is currently producing where  $MR < MC$ . If MC exceeds MR, it means that the firm is producing too much output. The firm should reduce output to the point where  $MR = MC$  to maximize profit. The firm will reduce output to get to the point where  $MR = MC$ . Reducing output will cause price to increase and MC to decrease.
10. C – Output will increase. See the graphs on this topic in the review packet.

11. C – Decreasing cost industry
12. D – When its price exceeds its average total cost. All types of firms earn a profit when price exceeds average total cost. Make sure to note that A is not correct because a monopolist who charges a price less than its average total cost will earn a loss. Having a monopoly makes it easier to earn profits; however, it does not guarantee you will earn a profit.
13. C – Diseconomies of scale
14. D – It is difficult to enter and leave the market. This answer is **not** a characteristic of perfectly competitive firms because there are low barriers to entry and exit in perfect competition.
15. D – Increasing cost industry
16. D – It is below the average revenue curve for a monopolist. Make sure to remember that the average revenue curve for a monopolist is the same thing as the demand curve. We know that MR is below the demand curve and it has a steeper slope.
17. A – The average revenue curve for a monopolist is the same thing as its demand curve.
18. D – Reduce output and raise price. When  $MR < MC$ , a firm should reduce output and raise price.
19. B – It will be negative. The economic profit will be negative because  $P < ATC$  at the quantity where  $MR = MC$ .
20. C – P2 and Q2. This problem has to do with the social costs of monopolies covered in the review. The perfect competition graph doesn't look like this, but if it did, we would produce where MC intersects the demand curve. Don't overthink why the graph changed; just know if you have a question on perfect competition and see a graph like this, perfect competition will produce where  $MC = D$ .
21. A – P1 and Q1. A monopoly will produce where  $MR = MC$ .

22. D – The monopoly would reduce quantity from  $Q_2$  to  $Q_1$  and raise price from  $P_2$  to  $P_1$ .
23. A – Ownership of resources that do not have close substitutes
24. B – Price discrimination will give the monopolist higher profits than a single price for all customers. This statement is assuming that all of the conditions for being able to price discriminate are met.
25. C – Services because it is easier to resell goods than services. Remember that one of the conditions to be able to price discriminate is that the customers paying the low price can't resell the product to customers paying the high price.
26. A – It will be positive. The economic profit will be positive because  $P > ATC$  at the quantity where  $MR = MC$ .
27. B – Monopolies always make a profit. Monopolies make a profit only if the price they charge is greater than  $ATC$ .
28. C – The firm identifies two or more groups and charges them different prices based on their willingness to pay.
29. B – Diminishing marginal product, economies of scale. Diminishing marginal product causes the short-run cost curve to be U-shaped. Economies (and diseconomies) of scale cause the long-run cost curve to be U-shaped.

30. C – No, because we will lose money on this transaction. For this problem, you need to compare the marginal revenue of this transaction to the marginal cost of the transaction. The marginal revenue will be \$30 because we get \$30 if we sell the additional unit. We need to add a total cost column to the table we were given in the problem so we can determine the MC of making the 21st unit.

Units	Average Cost	Total Cost
20	\$20	\$400
21	\$22	\$462

You can find the total cost by simply multiplying the average cost by the number of units produced. We can see that our total costs go from \$400 for producing 20 units to \$462 for producing 21 units. That means the marginal cost of producing the 21st unit is \$62 (remember that MC is the change in TC). Because the marginal revenue from selling the 21st unit is \$30 and the marginal cost is \$62, we should not take the order because we will lose money.

31. B – Price will return to its previous level. Refer to the graph in the packet for this section.

32. A – Constant cost industry

33. C – When the monopolist can separate markets by different price elasticities of demand and prevent the resale of the product. Firms must also face a downward-sloping demand curve to price discriminate; however, we know this condition is met because all monopolists face downward-sloping demand curves.

34. B – Relatively elastic

35. A – Q1

36. A – P1

37. A – It will be positive. The profit will be positive because  $\text{Price} > \text{ATC}$  at Q1.

38. C – Economies of scale. Economies of scale are a barrier to entry; however, the government does not have an influence on a firm's economies of scale.

39. D – Positive  $P_1$ ,  $P_2$ ,  $b$ ,  $a$ . See the section in the packet on graphing profit or monopolies.
40. C – The demand of students for their pizza must be elastic. The students have elastic demand. This means a small decrease in price will cause a large increase in quantity, which will increase revenue.
41. D – The market price for their goods is affected by the amount they sell. This is because if a monopolistically competitive firm wants to see more goods, they will have to lower price.
42. D – Cereal. There are many different brands of cereal.
43. B – We know the firms represented by the demand curves in the graph are perfectly competitive firms because the demand curves are horizontal. In perfect competition, the demand curve is the same thing as the MR curve. So we are looking for the point where the demand curve intersects the MC curve.
44. D
45. A – 0, A, J, E. See the section on graphing total revenue for perfectly competitive firms in the review packet.
46. C – 0, C, M, H. See the section on graphing total revenue for perfectly competitive firms in the review packet.
47. A – Negative. Negative describes the company's economic profit because  $P < ATC$ .
48. B – Zero. Zero describes the company's economic profit because  $P = ATC$ .
49. C – Positive. Positive describes the company's economic profit because  $P > ATC$ .
50. A – If quantity falls below output level A, price will become less than AVC.
51. B – Increasing cost industry. Refer to the graph in the packet for this section.
52. A – Constant cost industry. Refer to the graph in the packet for this section.

53. C – Marginal cost curves above their intersection with average variable cost
54. A – Price will decrease. Refer to the graph in the packet for this section.
55. C – A monopolist will charge a higher price than a perfect competitor. Take a look at the section in the monopoly chapter on the social costs of monopolies.
56. C – There is a tradeoff between product variety and the ability to minimize cost per unit.
57. C – Diseconomies of scale. Diseconomies of scale is the upward-sloping portion of the long-run average total cost curve.
58. C – Delta is losing money because its fixed costs are not being taken into account. An additional passenger costs Delta \$30, and it is charging \$200. At first, it might seem like Delta is making \$170 on each passenger; however, Delta's fixed costs need to be taken into account. Fixed costs—like the cost of the plane, fuel, pilots, and flight crew—also need to be taken into account when determining profit.
59. B – Setting  $MR = MC$ . All firms maximize profit by setting  $MR = MC$ .
60. A – Perfectly elastic. Perfectly competitive firms have horizontal demand curves.
61. C – Downward sloping. Make sure to note this problem is asking about a perfectly competitive **industry**. The demand curve for an individual firm in a perfectly competitive industry is horizontal; however, the demand for the entire industry is downward sloping. Make sure to pay close attention to whether these sort of problems are asking about an individual firm or the entire industry.
62. C – Decreasing cost industry. Refer to the graphs in this section of the packet.
63. B – Constant returns to scale. This is the range of output where cost per unit is minimized.
64. C – Each worker adds the same amount of cost but different amounts of output.
65. C – Price and MR are always equal.

66. C – Price is below minimum average total cost.
67. D – Only monopolists can earn a positive profit in the long run.
68. A – Price will decrease. Refer to the graphs in this section of the packet.
69. B – A large minimum efficient scale. A large minimum efficient scale means that a large level of output needs to be produced to be able to produce at the minimum cost per unit. A large minimum efficient scale is a barrier to entry, which is why it is the most likely to lead to a monopoly.
70. D – Graph B is the demand curve for perfect competition, and graph A is the demand curve for a monopoly.
71. C – Decreasing cost industry. Refer to the graphs in this section of the packet.
72. C – It will produce at a point where price exceeds the minimum of average costs. Review this section of the packet for a detailed explanation of what this means.
73. C – Constant returns to scale
74. B – Increasing cost industry. Refer to the graphs in this section of the packet.
75. C – There will be zero economic profits in the long-run equilibrium. This is because of the low barriers to entry and exit in monopolistically competitive markets.
76. C – Consumers tend to prefer one brand over another. This statement does **not** apply to perfectly competitive industries because products are homogenous, which means everyone sells identical products.
77. C – Firms will break even. Breaking even is another way of saying firms will earn zero economic profit.
78. C – The market price
79. C – Monopolistic competition produces a wider variety of goods but at a higher price.

80. D –  $AVC > P$ .  $AVC > P$  because a firm should shutdown when  $AVC$  exceeds price.
81. B – His losses will be equal to his fixed costs. If he shuts down, the only costs he will have will be fixed costs.
82. C – The demand for each existing firm will shift to the left.
83. B – When price is \$7. In perfect competition,  $MR = P$ . The firm will produce where  $MR = MC$ . A firm will earn zero profit when the  $ATC$  is tangent to the demand curve at the point where the demand curve intersects  $MC$  because this is the point where  $P = ATC$ .
84. C – When price is less than \$7
85. D –  $AVC > P$
86. A – More firms will enter the market.
87. C – It will be equal the cost of production. Saying that price is equal to the cost of production is another way of saying that  $P = ATC$ . We know that  $P$  must equal  $ATC$  in the long run in a perfectly competitive industry because firms earn zero economic profit in the long run in a perfectly competitive industry.
88. A – When a firm produces at the minimum point of the average total cost curve
89. C – In the long run, they will have an economic profit of zero. Saying a firm is a price taker is the same thing as saying the firm is a perfectly competitive firm.
90. B – Begins at A and goes along the  $MC$  curve as quantity increases



91. B – \$88,000

$$\text{Revenue} = \$420,000$$

$$\text{Explicit costs} = \$100,000 + \$12,000 + \$140,000 + \$75,000 + \$5,000 = \$332,000$$

$$\text{Accounting profit} = \$420,000 - \$332,000 = \$88,000$$

92. A – Negative \$42,000

$$\text{Revenue} = \$420,000$$

$$\text{Explicit costs} = \$100,000 + \$12,000 + \$140,000 + \$75,000 + \$5,000 = \$332,000$$

Since we are now solving for economic profit we need to find the total implicit costs in addition to the total explicit costs. Implicit costs are the owner's opportunity costs of running his business.

- 1) The owner could earn \$16,000 a year renting the space the bar is in as two offices at \$8,000 per year each.
- 2) The owner would have earned 4% interest on the \$100,000 in his savings account if he didn't take the money out of the savings account to invest in the business. This lost interest is an opportunity cost. The amount of interest the owner would have earned is found by multiplying \$100,000 by the interest rate of 4%. This means the opportunity cost of spending the \$100,000 was \$4,000 ( $\$100,000 \times 0.04 = \$4,000$ ).
- 3) The owner gave up his salary of \$110,000 a year to run the bar so it is an opportunity cost.

$$\text{Implicit costs} = \$16,000 + \$4,000 + \$110,000 = \$130,000$$

$$\text{Economic profit} = \$420,000 - \$332,000 - \$130,000 = -\$42,000$$

93. A – The firm represented by the graph is currently earning a positive profit. The firm is currently producing where  $MR = MC$ . At this level of output,  $P > ATC$ , so the firm is earning a positive economic profit.

94. A –  $P = \$20$ ,  $Q = 12$ . The horizontal demand curve tells us this is a perfectly competitive industry. We know that in the long run, perfectly competitive industries earn zero economic profit. The firms also produce at the minimum of the ATC curve. The minimum point of the ATC will always be the point where MC intersects ATC. Consequently, the long-run equilibrium will be a price of \$20 and a quantity of 12.

95.

	Firm #1	Firm #2	Firm #3	Firm #4
Price	\$1.00	\$0.75	\$5.00	\$0.50
Output	2,000	500	1,000	1,500
TR	\$2,000	\$375	\$5,000	\$750
TC	\$800	\$725	\$5,000	\$600
TFC	\$200	\$225	\$500	\$450
TVC	\$600	\$500	\$4,500	\$150
ATC	\$0.40	\$1.45	Minimum	\$0.40
AVC	\$0.30	\$1.00	\$4.50	\$0.10
MC	\$0.40	\$0.75	\$5.00	\$0.80
Suggestion	I	SD	C	D

**Firm #1**

$$\text{TR} = \text{Price} \times \text{Output}$$

$$\$2,000 = \$1.00 \times \text{Output}$$

$$\text{Output} = 2,000$$

$$\text{ATC} = \text{TC} / \text{Output}$$

$$\$0.40 = \text{TC} / 2,000$$

$$\text{TC} = \$800$$

$$\text{TC} = \text{TFC} + \text{TVC}$$

$$\$800 = \text{TFC} + \$600$$

$$\text{TFC} = \$200$$

$$\text{AVC} = \text{TVC} / \text{Output}$$

$$\text{AVC} = \$600 / 2,000$$

$$\text{AVC} = \$0.30$$

$$\text{MR} = \text{Price} = \$1.00$$

$$\text{MC} = \$0.40$$

MR > MC, so we need to increase production.

**Firm #2**

$$TR = \text{Price} \times \text{Output}$$

$$\$375 = \text{Price} \times 500$$

$$\text{Price} = \$0.75$$

$$AVC = \text{TVC} / \text{Output}$$

$$\$1.00 = \text{TVC} / 500$$

$$\text{TVC} = \$500$$

$$\text{TC} = \text{TFC} + \text{TVC}$$

$$\$725 = \text{TFC} + \$500$$

$$\text{TFC} = \$225$$

$$\text{ATC} = \text{TC} / \text{Output}$$

$$\text{ATC} = \$725 / 500$$

$$\text{ATC} = \$1.45$$

$$\text{MR} = \text{Price} = \$0.75$$

$$\text{MC} = \$0.75$$

MR = MC, so we know we are producing the quantity that will maximize profit or minimize our loss. Now we need to compare price to ATC to see whether we have a profit or loss at this quantity.

$$\text{ATC} = \$1.45$$

ATC > Price, so we know we are operating at a loss. Now we need to compare price to average variable cost to see whether we could continue to operate at a loss or we should shut down.

$$\text{AVC} = \$1.00$$

AVC > Price, so the firm should shut down.

### **Firm #3**

$$TR = \text{Price} \times \text{Output}$$

$$TR = \$5 \times 1,000$$

$$TR = \$5,000$$

$$AVC = \text{TVC} / \text{Output}$$

$$\$4.50 = \text{TVC} / 1,000$$

$$\text{TVC} = \$4,500$$

$$\text{TC} = \text{TFC} + \text{TVC}$$

$$\$5,000 = \text{TFC} + \$4,500$$

$$\text{TFC} = \$500$$

The problem does not directly tell us ATC. Instead, it tells us that ATC is at its minimum point. When a firm is producing at the minimum point of the ATC curve, it is producing at the point where  $MR = MC$ . It is also producing at the point where price equals ATC. You can see this by solving for ATC.

$$\text{ATC} = \text{TC} / \text{Output}$$

$$\text{ATC} = \$5,000 / 1,000$$

$$\text{ATC} = \$5$$

We know that the firm is producing where  $MR = MC$  because the firm is producing at the minimum point of the ATC curve. We also know that  $\text{Price} = MR$  because the firm is in a perfectly competitive industry. This means that the value of MC will be equal to Price.

$$\text{Price} = MR = MC = \$5.00$$

Because the firm is producing where  $MR = MC$ , the firm is producing the profit maximizing quantity. Now we need to compare price to ATC to see whether we have a profit or loss at this quantity.

$$\text{ATC} = \$5.00$$

Because  $\text{ATC} = \text{Price}$ , we know that the firm is earning zero economic profit. Firms continue to operate when earning zero economic profit. The firm is producing the profit maximizing quantity, so it should continue to operate at its current level of production.

#### **Firm #4**

$$TR = \text{Price} \times \text{Output}$$

$$\$750 = \$0.50 \times \text{Output}$$

$$\text{Output} = 1,500$$

$$ATC = TC / \text{Output}$$

$$\$0.40 = TC / 1,500$$

$$TC = \$600$$

$$AVC = TVC / \text{Output}$$

$$\$0.10 = TVC / 1,500$$

$$TVC = \$150$$

$$TC = TFC + TVC$$

$$\$600 = TFC + \$150$$

$$TFC = \$450$$

$$MR = \text{Price} = \$0.50$$

$$MC = \$0.80$$

$MR < MC$ , so the firm will either decrease production or shut down altogether.

The next step is to compare price to ATC.

$$\text{Price} = \$0.50$$

$$ATC = \$0.40$$

Because  $\text{Price} > ATC$ , we know that the firm is earning a profit. It is possible for a firm to earn a profit even if it isn't producing where  $MR = MC$ ; however, it means that if the firm decreases production to the point where  $MR = MC$ , it will earn an even larger profit. This firm should continue to operate because it is earning a profit; however, it should decrease production to the point where  $MR = MC$ .

96.

<b>Q</b>	<b>TC</b>	<b>TVC</b>	<b>TFC</b>	<b>ATC</b>	<b>AVC</b>	<b>AFC</b>	<b>MC</b>
<b>0</b>	100	0	100	-	-	-	
<b>1</b>	110	10	100	110	10	100	10
<b>2</b>	130	30	100	65	15	50	20
<b>3</b>	160	60	100	53.3	20	33.3	30
<b>4</b>	220	120	100	55	30	25	60
<b>5</b>	300	200	100	60	40	20	80

**When Q = 2:**

$$\text{TVC} = \text{TC} - \text{TFC} = 130 - 100 = 30$$

$$\text{TFC} = 100$$

\*TFC will be 100 in all rows because fixed costs stay constant by definition.

$$\text{ATC} = \text{TC} / \text{Q} = 130 / 2 = 65$$

$$\text{AVC} = \text{TVC} / \text{Q} = 30 / 2 = 15$$

$$\text{AFC} = \text{TFC} / \text{Q} = 100 / 2 = 50$$

$$\text{MC} = \text{Change in TC} = 130 - 110 = 20$$

**When Q = 3:**

$$\text{TC} = \text{TVC} + \text{TFC} = 60 + 100 = 160$$

$$\text{TFC} = 100$$

$$\text{ATC} = \text{TC} / \text{Q} = 160 / 3 = 53.3$$

$$\text{AVC} = \text{TVC} / \text{Q} = 60 / 3 = 20$$

$$\text{AFC} = \text{TFC} / \text{Q} = 100 / 3 = 33.3$$

$$\text{MC} = \text{Change in TC} = 160 - 130 = 30$$

**When Q = 4:**

$$\text{TVC} = \text{MC when } Q=4 + \text{TVC when } Q=3 = 60 + 60 = 120$$

$$\text{TC} = \text{TVC} + \text{TFC} = 120 + 100 = 220$$

$$\text{TFC} = 100$$

$$\text{ATC} = \text{TC} / Q = 220 / 4 = 55$$

$$\text{AVC} = \text{TVC} / Q = 120 / 4 = 30$$

$$\text{AFC} = \text{TFC} / Q = 100 / 4 = 25$$

**When Q = 5:**

$$\text{TVC} = \text{AVC} \times Q = 40 \times 5 = 200$$

$$\text{TC} = \text{TVC} + \text{TFC} = 200 + 100 = 300$$

$$\text{TFC} = 100$$

$$\text{ATC} = \text{TC} / Q = 300 / 5 = 60$$

$$\text{AFC} = \text{TFC} / Q = 100 / 5 = 20$$

$$\text{MC} = \text{Change in TC} = 300 - 220 = 80$$



97. Output = 600. Find the point where MR = MC, and go down to find output.

98. MC = \$2. Find MR = MC, and go over to find MC.

99. TC = \$4,200

$$TC = ATC \times \text{Output}$$

$$TC = \$7 \times 600$$

$$TC = \$4,200$$

100. P = \$5. Find MR = MC. Then go up to the demand curve and THEN over to find price.

101. TR = \$3,000

$$TR = \text{Price} \times \text{Output}$$

$$TR = \$5 \times 600$$

$$TR = \$3,000$$

102. -\$1,200 loss

$$\text{Profit/Loss} = TR - TC$$

$$\text{Profit/Loss} = \$3,000 - \$4,200$$

$$\text{Profit/Loss} = -\$1,200$$

103. Output = 800. Find D = MC, and go down to find output.

104. Price = \$4.20. You are using the point where D = MC, so you simply need to go over to find price because you are already at the demand curve.

105. \$1.75

$$\text{Monopoly ATC} = \$7$$

$$\text{Perfect comp ATC} = \$5.25$$

$$\$7 - \$5.25 = \$1.75$$