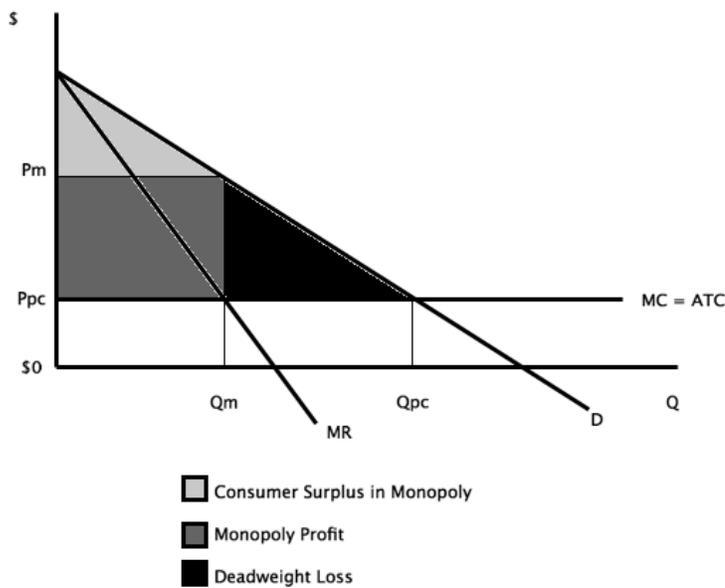




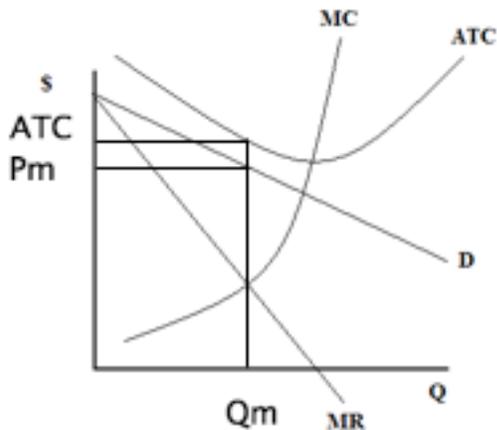
www.LionTutors.com

ECON 102 Wooten – Exam 3 – Practice Exam Solutions

1. A monopolist will increase price and decrease quantity to maximize profits when compared to perfect competition because a monopolist will produce where  $MR = MC$



2. Profit will be negative because  $ATC > P$  at the point where  $MR = MC$



3.

Q	TC	TVC	TFC	ATC	AVC	AFC	MC
0	100	0	100	-	-	-	-
1	110	10	100	110	10	100	10
2	130	30	100	65	15	50	20
3	160	60	100	53.3	20	33.3	30
4	220	120	100	55	30	25	60
5	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:**

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

$$TC = TVC + TFC = 120 + 100 = 220$$

$$TFC = 100$$

$$ATC = TC / Q = 220 / 4 = 55$$

$$AVC = TVC / Q = 120 / 4 = 30$$

$$AFC = TFC / Q = 100 / 4 = 25$$

**When Q=5:**

$$TVC = AVC \times Q = 40 \times 5 = 200$$

$$TC = TVC + TFC = 200 + 100 = 300$$

$$TFC = 100$$

$$ATC = TC / Q = 300 / 5 = 60$$

$$AFC = TFC / Q = 100 / 5 = 20$$

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

4. \$980

$$TC = 800 + 6q$$

$$TC = 800 + 6(30)$$

$$TC = 980$$

5. \$180 – Variable cost is the slope multiplied by the number of units.

$$VC = 6(30) = 180$$

6. \$800 – Fixed cost is the constant in the total cost equation.

7. \$32.67

$$ATC = TC / Q$$

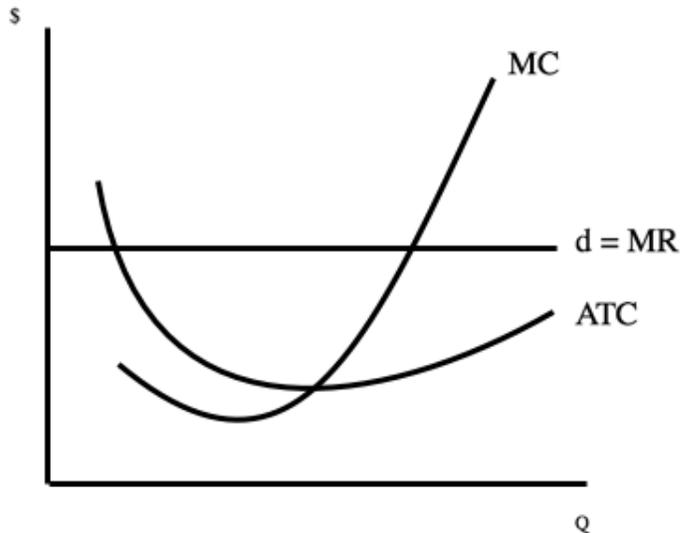
$$ATC = 980 / 30$$

$$ATC = 32.67$$

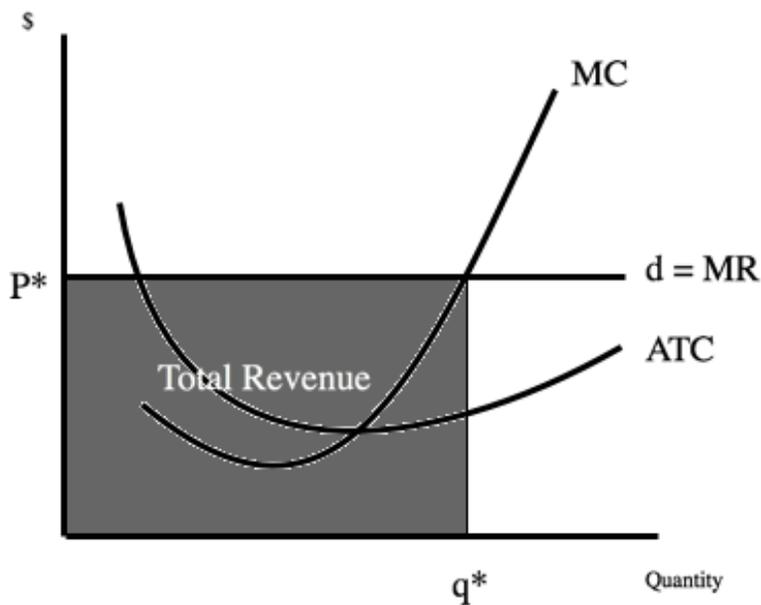
8. \$6 – Marginal cost is the cost of selling one more unit. Marginal cost is the slope of the total cost equation.

9. Make sure that you indicate that the horizontal line is both the demand curve and the marginal revenue curve. The demand curve will always be the marginal revenue curve in perfect competition.

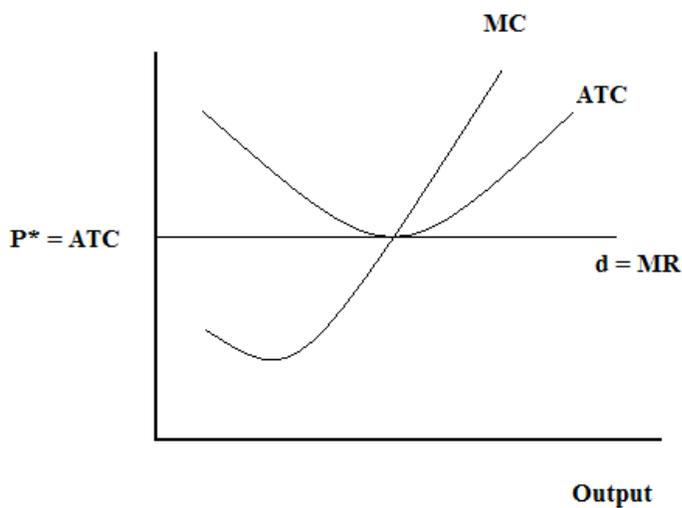
If there was a 2<sup>nd</sup> curve below the ATC curve, it would be the AVC curve. Since there is only one curve, it has to be ATC. We know it must be ATC when looking at the last problem because we can't answer that question without the ATC curve.



10. Total revenue = Price x Quantity – In the graph, total revenue is the rectangle formed using points P\* and q\*.



11. Economic profit will be positive because price is greater than ATC at the equilibrium quantity.
12. The number of firms will increase because the positive economic profit will attract more firms to the market. If costs stay constant, the market price must decrease because we know that price will be equal to average total cost in the long run. The long run equilibrium is represented by the graph below. Since we are told costs stay constant, we know the ATC curve will not change. The only way to reach the long run equilibrium is for price to decrease to the point where  $P = ATC$ .



13. The firm with the most users will control the market when network externalities are present. In the early days of social media, Facebook controlled the market because it had the most users.
14. Automobiles, Athletic footwear, and Cigarettes
15. 56

$$MPL_4 = Q_4 - Q_3$$

$$MPL_4 = 156 - 100$$

$$MPL_4 = 56$$

16. The 6<sup>th</sup> worker

To solve this problem, we need to find the MPL for each worker. Then we look for the point where MPL begins to decline.

Units of Labor	Output	MPL
0	0	-
1	20	20
2	52	32
3	100	48
4	156	56
5	220	64
<b>6</b>	<b>264</b>	<b>44</b>
7	292	28
8	304	12

17. You will be optimizing consumption when the marginal utility per dollar for the last dollar spent on each good you purchase is equal.

$$\frac{(MU \text{ of good } A)}{(Price \text{ of good } A)} = \frac{(MU \text{ of good } B)}{(Price \text{ of good } B)} = \frac{(MU \text{ of good } C)}{(Price \text{ of good } C)}$$

18. More firms will enter the market until economic profit falls to zero.

19. The highlighted values are the ones that were given in the original problem.

Q	TFC	TVC	TC	AFC	AVC	ATC	MC
10	300	350	650	30	35	65	65
20	300	670	970	15	33.5	48.5	32
30	300	1020	1320	10	34	44	35
40	300	1420	1720	7.5	35.5	43	40
50	300	1900	2200	6	38	44	48

Make sure to note that quantity is increasing by 10 in each row. Typically, quantity will increase by one unit at a time in problems like this. This means the change in quantity is one unit. In this problem, the change in quantity will be 10 units. This will impact our calculation of marginal cost.

**Q = 10**

$$TFC = AFC * Q = 30 * 10 = 300$$

$$TC = TFC + TVC = 300 + 350 = 650$$

$$AVC = TVC / Q = 350 / 10 = 35$$

$$ATC = TC / Q = 650 / 10 = 65$$

$$MC = \Delta TC / \Delta Q = (650 - 0) / 10 = 65$$

**Q = 20**

MC = 32 (given) – Use MC to find Total Cost for 20 units

$$MC = \Delta TC / \Delta Q$$

$$MC = (TC_{20} - TC_{10}) / \Delta Q$$

$$32 = (TC_{20} - 650) / 10$$

$$320 = TC_{20} - 650$$

$$TC_{20} = 970$$

TFC = 300 (TFC is the same for all levels of output)

$$TVC = TC - TFC = 970 - 300 = 670$$

$$AFC = TFC / Q = 300 / 20 = 15$$

$$AVC = TVC / Q = 670 / 20 = 33.5$$

$$ATC = TC / Q = 970 / 20 = 48.5$$

**Q = 30**

$$TFC = 300$$

$$TVC = TC - TFC = 1320 - 300 = 1020$$

$$AFC = TFC / Q = 300 / 30 = 10$$

$$AVC = TVC / Q = 1020 / 30 = 34$$

$$ATC = TC / Q = 1320 / 30 = 44$$

$$MC = \Delta TC / \Delta Q = (1320 - 970) / 10 = 35$$

**Q = 40**

TFC = 300

TC = TFC + TVC = 300 + 1420 = 1720

AFC = TFC / Q = 300 / 40 = 7.5

AVC = TVC / Q = 1420 / 40 = 35.5

ATC = TC / Q = 1720 / 40 = 43

MC =  $\Delta TC / \Delta Q = (1720 - 1320) / 10 = 40$

**Q = 50**

TFC = 300

TVC = AVC \* Q = 38 \* 50 = 1900

TC = TFC + TVC = 300 + 1900 = 2200

AFC = TFC / Q = 300 / 50 = 6

ATC = TC / Q = 2200 / 50 = 44

MC =  $\Delta TC / \Delta Q = (2200 - 1720) / 10 = 48$

20. 40 units – We were told in the initial information given in the problem that each unit sells for \$47. We were also told that this is a perfectly competitive market. Since the demand curve is horizontal in perfectly competitive markets, we know the MR = P. Thus, if we know price is \$47, we also know that MR is \$47.

Q	TFC	TVC	TC	AFC	AVC	ATC	MC
10	300	350	650	30	35	65	65
20	300	670	970	15	33.5	48.5	32
30	300	1020	1320	10	34	44	35
40	300	1420	1720	7.5	35.5	43	40
50	300	1900	2200	6	38	44	48

All firms maximize profit by producing at the point where MR = MC. However, firms often can't get to this exact point because it is not possible to sell a fraction of a unit. When we look at the MC column that we completed in the table, we see we do not have a quantity that has a MC equal to \$42. The firm will maximize profit when it produces 40 units because it is the point where MR is closest to MC without going over. It does not matter that \$47 is closer to \$48 than \$40. We never want to produce when MC > MR.

21. \$160

P = \$47

TR<sub>40</sub> = P x Q = \$47 x 40 = \$1,880

TC<sub>40</sub> = \$1,720

Profit = TR – TC = \$1,880 – \$1,720 = \$160

22.  $HHI = 25^2 \times 4 = 2,500$

Increasing HHI values correspond to (increased) market concentration.

23.  $HHI = 51^2 + 36^2 + 9^2 + 4^2 = 3994$

The third and fourth firms would now be one firm that makes up 13% ( $9\% + 4\% = 13\%$ ) of the market.

$HHI = 51^2 + 36^2 + 13^2 = 4066$

Post-merger  $HHI > 2500$

Change in HHI =  $4066 - 3994 = 72$

Change less than 100 = The government is unlikely to challenge the merger

HHI Value After Merger	Amount by Which Merger Increases HHI	Antitrust Action by Federal Regulators
Less than 1,500	Increase does not matter	Merger will be allowed
Between 1,500 and 2,000	Fewer than 100 points	Merger is unlikely to be challenged
Between 1,500 and 2,000	More than 100 points	Merger may be challenged
Greater than 2,500	Fewer than 100 points	Merger is unlikely to be challenged
Greater than 2,500	Between 100 and 200 points	Merger may be challenged
Greater than 2,500	More than 200 points	Merger is likely to be challenged

24. All of the following are examples of irrational consumer behavior

- **Misperceptions of opportunity costs** – It is important that opportunity costs are correctly accounted for
  - **People tend to ignore** – Non-monetary opportunity costs
  - **People tend mistakenly include** – Sunk costs
- **Overconfidence** – Individuals often overestimate their abilities
  - Ex: Non-professional investors who engage in speculative investing have dramatically worse rates of return than professional investors. Often, non-professional investors are exposed to significantly more risk than they realize.
- **Unrealistic expectations about future behavior** – People are overconfident about the future
  - Tends to lead to procrastination
  - Ex: Getting an annual gym membership in January that you only use a couple times.
- **Counting dollars unequally** – Individuals use “mental accounting” that leads them to value some dollars more than others even though all dollars have equal value
  - **Mental accounting** – Assigning dollars to different accounts so that some dollars are worth more than others
  - Ex: People tend to spend more money at the bar on payday
- **Loss aversion** – When individuals are overly sensitive to losing money
  - People who can't move on from a loss
  - Ex: Making poor decisions because you are too afraid of losing what you have
- **Status quo bias** – A tendency to avoid making decisions
  - People tend to continue doing what they are doing
  - Ex: Sticking with a job you hate for decades
- **Taking sunk costs into account** – Sunk costs are irrelevant to future decision making
  - Always ignore sunk costs when making decisions about future actions

25. B is ATC

26. D is AFC

27. C is AVC

28. A is MC

29. D – It is the MC curve at and above the intersection with the average variable cost curve

30. C – Increase output because  $MR > MC$ . Remember that  $P = MR$  in perfect competition.

31. D – Shutdown because  $P < AVC$ . When  $P < AVC$ , the firm should stop all production.

32. \$54,000

$$\text{Explicit costs} = \$33,000 + \$6,000 + \$57,000 = \$96,000$$

$$\text{Accounting profit} = \$150,000 - \$96,000 = \$54,000$$

33. \$47,000

$$\text{Implicit costs} = \$5,000 + \$2,000 = \$7,000$$

$$\text{Economic profit} = \$150,000 - \$103,000 = \$47,000$$

34. \$7 – In perfect competition  $MR = P$ . The firm will produce where  $MR = MC$ . A firm will be earning 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  $P = ATC$ .

35. When price is less than \$7 because ATC will be greater than price at any level of output if price is less than \$7.

36. \$560

$$\text{MC 4}^{\text{th}} \text{ unit} = \$800 - \$240 = \$560$$

37. \$80

$$\text{ATC 3}^{\text{rd}} \text{ units} = \$240 / 3 = \$80$$

38. C – When diminishing marginal product begins

39. A – Perfectly elastic. Make sure to play close attention to whether you are asked about an individual firm or the entire industry.

40. 1) Price must be greater than AVC. If price is less than AVC, the firm will shutdown and produce 0 units. The minimum point of the AVC curve is referred to as the shutdown price for a firm.

2) The marginal cost curve needs to be at the point where it is increasing.

41. D – The diminishing product of labor

42. A – Price

43. The first step is to make a complete table where you find the values for TC, MC, and AVC using the information provided in the problem. You can also find ATC and AFC, but you don't actually need ATC and AFC to solve the problem.

Output	VC	FC	TC	MC	AVC	ATC	AFC
0	\$0	\$90	\$90	-	-	-	-
1	\$210	\$90	\$300	\$210	\$210	\$300	\$90
2	\$360	\$90	\$450	\$150	\$180	\$225	\$45
3	\$450	\$90	\$540	\$90	\$150	\$180	\$30
4	\$630	\$90	\$720	\$180	\$158	\$180	\$23
5	\$840	\$90	\$930	\$210	\$168	\$186	\$18
6	\$1,170	\$90	\$1,260	\$330	\$195	\$210	\$15

We are dealing with a perfectly competitive firm so we know that the market price is also the marginal revenue for the firm. The firm wants to produce at the point where  $MR = MC$ . If we don't have a point where  $MR = MC$ , we want to produce as many units as possible without letting  $MR$  fall below  $MC$ .

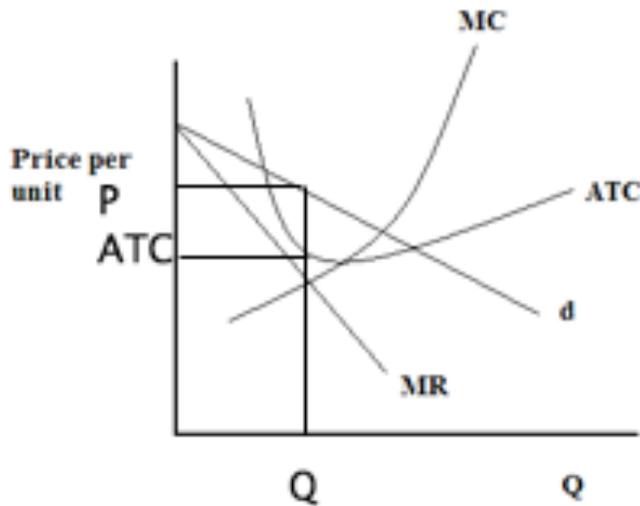
The first step is to determine the profit maximizing level of output for each price. Then we need to make sure the price is greater than  $AVC$  at that level of output. If  $AVC$  is greater than the price at the profit maximizing level of output, the firm should shut down and produce 0 units.

At a price of \$95, the profit maximizing level of output would be 3 units. However,  $AVC$  for producing 3 units is \$150, which is greater than the price of \$95. So, the firm should produce 0 units, and its total cost will be equal to its fixed costs. A firm's losses will never be less than total fixed costs because the firm can always shut down and only incur the fixed costs.

At each of the other price points, price will be greater than  $AVC$  at the profit maximizing level of output. In this case, we find total revenue by multiplying price by the number of units produced. We then take the difference between total revenue and total cost to find profit.

Market Price	Profit maximizing level of output	Total Revenue	Total Cost	Profit
\$95	0	\$0	\$90	-\$90
\$168	3	\$504	\$540	-\$36
\$186	4	\$744	\$720	\$24
\$225	5	\$1,125	\$930	\$195
\$255	5	\$1,275	\$930	\$345

44. C – The demand curve for the entire industry is downward sloping. Make sure to pay close attention to whether you are asked about an individual firm or the entire industry.
45. The firm is earning a positive economic profit because  $P > ATC$



As this market moves toward a long-run equilibrium, firms will **(enter)** the industry because economic profits are positive.

This will shift the demand curves for existing firms to the **(left)**, and the demand curves of existing firms will become **(more)** elastic.

The new firms in the market will steal customers from the existing firms, which will cause the demand curve to shift to the left for the existing firms. Consumers will now be more sensitive to changes in price because there is additional competition in the market so demand curves will become more elastic.

46. C – Monopolistic competition produces a wider variety of goods but at a higher price.
47. D – Perfect competition assumes that products are homogeneous (identical); however, monopolistic competition assumes products are differentiated.

48.  $HHI = 20^2 \times 5 = 2,000$

Now we have a total of four firms in the industry. Three of the firms are still 20% of the industry, and one firm is now 40% of the industry.

$HHI = 40^2 + (20^2 \times 3) = 2,800$

Post-merger  $HHI > 2500$

Change in  $HHI = 2,800 - 2,000 = 800$

Change  $> 200 =$  Likely challenge

HHI Value After Merger	Amount by Which Merger Increases HHI	Antitrust Action by Federal Regulators
Less than 1,500	Increase does not matter	Merger will be allowed
Between 1,500 and 2,000	Fewer than 100 points	Merger is unlikely to be challenged
Between 1,500 and 2,000	More than 100 points	Merger may be challenged
Greater than 2,500	Fewer than 100 points	Merger is unlikely to be challenged
Greater than 2,500	Between 100 and 200 points	Merger may be challenged
Greater than 2,500	More than 200 points	Merger is likely to be challenged

49. De Beers controlled most of the world's diamond mines.

50. C – Strategic dependence. The actions of one firm, will directly impact the actions of the other firms in the market.

51. \$30

$MR_5 = TR_5 - TR_4$

$TR_4 = \$80 \times 4 = \$320$

$TR_5 = \$70 \times 5 = \$350$

$MR_5 = \$350 - \$320$

$MR_5 = \$30$

52. 56

We need to set  $MR = MC$ . To find MR, we need to double the slope of the demand equation.

$$P = 6,000 - 50Q$$

$$MR = 6,000 - (2)50Q$$

$$MR = 6,000 - 100Q$$

$$MC = \$400$$

$$MR = MC$$

$$6,000 - 100Q = 400$$

$$5600 = 100Q$$

$$Q = 56$$

53. \$3,200

$$P = 6,000 - 50Q$$

$$P = 6,000 - 50(56)$$

$$P = 3,200$$

54. \$156,800

$$\text{Profit} = (\text{Price} - MC)(Q) - FC$$

$$\text{Profit} = (\$3,200 - \$400)(56) - \$0$$

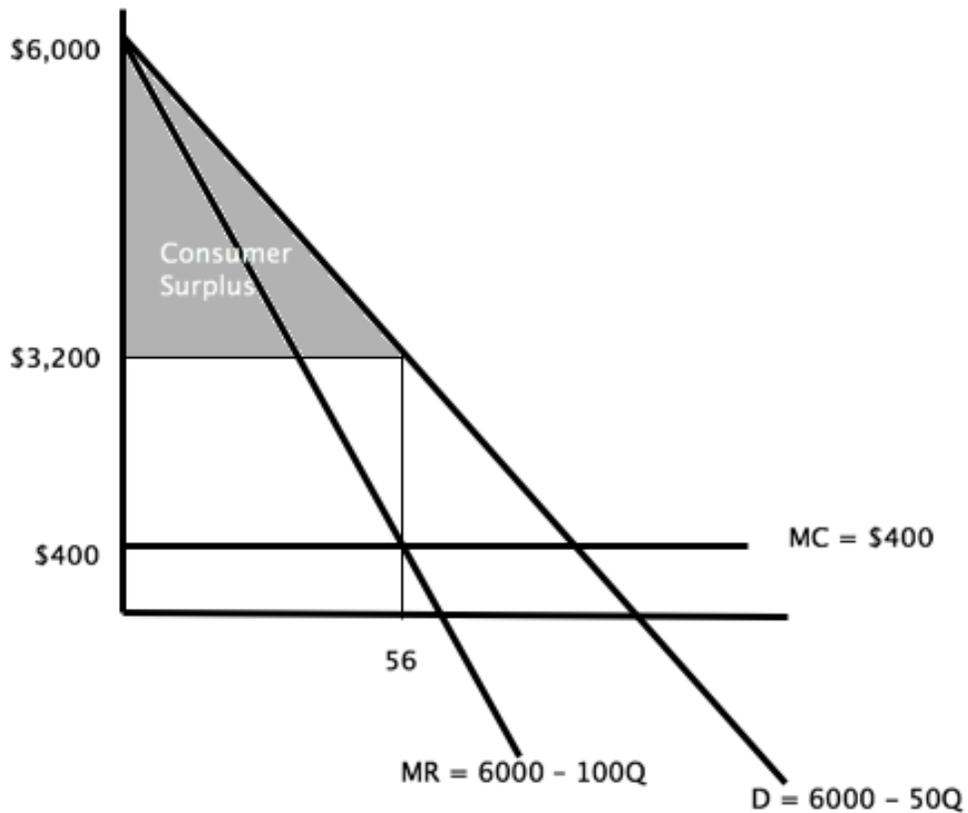
$$\text{Profit} = \$156,800$$

55. 78,400

CS is the area below the demand curve but above the equilibrium price.

$$CS = (1/2)(56)(6,000 - 3,200)$$

$$CS = 78,400$$



56. \$400. In a perfectly competitive market,  $P = MC$ .

57. 112

$$P = MC$$

$$6,000 - 50Q = 400$$

$$5,600 = 50Q$$

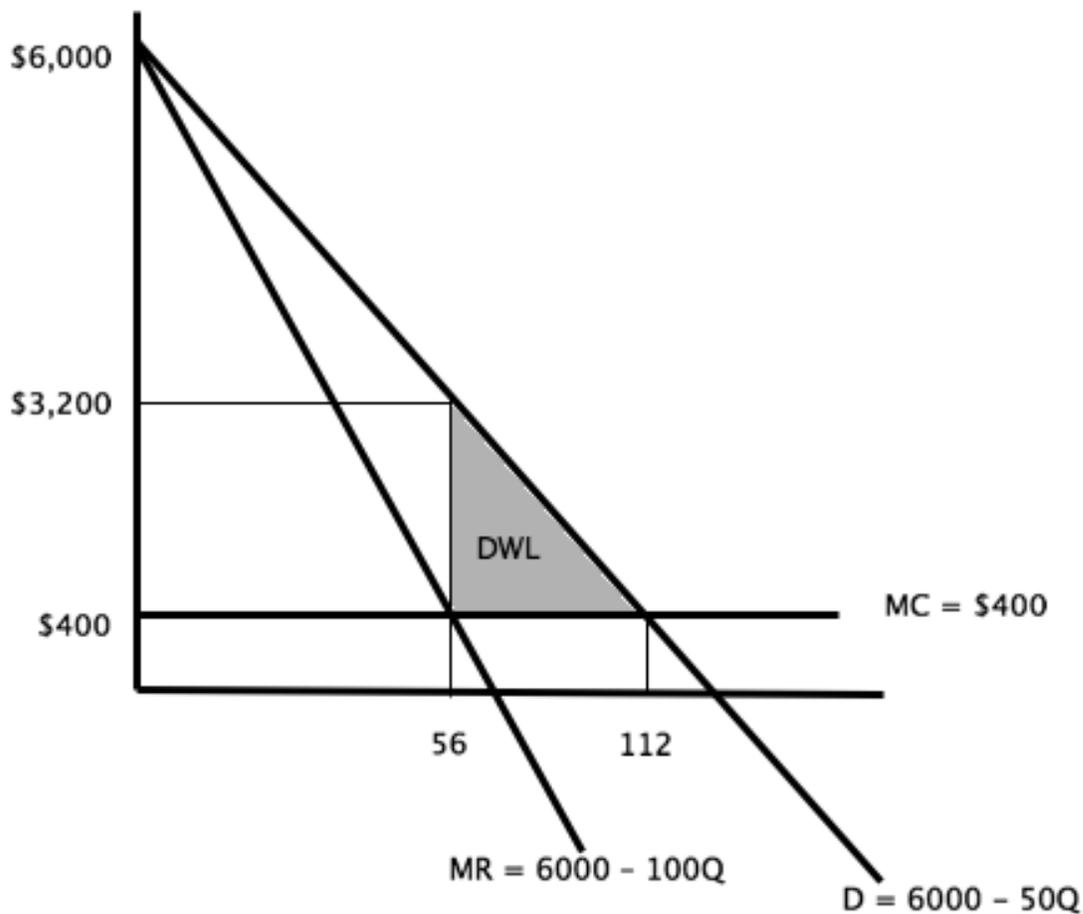
$$Q = 112$$

58. 78,400

DWL is the area where we have producer or consumer surplus under perfect competition; however, we have neither producer or consumer surplus under monopoly.

$$DWL = (1/2)(112 - 56)(3200 - 400)$$

$$DWL = 78,400$$



59. C – 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 over think 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.

60. A – A monopoly will produce where  $MR = MC$ ; however, you must go up to the demand curve and then over to determine price.
61. D – If you understand the questions above this question should make sense. We put this on the practice exam to show you another way this type of question could be asked.
62. Ownership of resources that do not have a close substitute
63. B – Monopolies always make a profit is false. Monopolies have the ability to earn long-run economic profits; however, they are not guaranteed to earn a profit. Monopolists will only earn a profit if they are able to set price above average total cost. If you have a monopoly on something that nobody wants, you won't be able to earn a profit because you won't have any customers.
64. D – Positive because  $P > ATC$ .
- Profit = (Price – ATC) x Q
65. D – The market price for their goods is affected by the amount they sell
66. D – Cereal
67. C – There is a tradeoff between product variety and the ability to minimize cost per unit
68. E – P1, Q1 because this is the point where  $MR = MC$ . Make sure to remember you up to the demand curve and then over to find price.
69. D – P1, A, B, P4 because profit is the difference between price and average total cost multiplied by quantity.
70. B – Q3, P2 because if a firm is able to use perfect price discrimination it will produce all the way to the point where  $P = MC$ . This is the point where the MC curve and demand curve intersect.
71. When firms cooperate without an explicit agreement
72. C – It can be an effective barrier to entry because it increases the cost of competing in the market for firms looking to enter the market

73. D – Only monopolists can earn a profit in the long-run
74. C – Monopolistic competition is more competitive than oligopoly
75. Like all firms in every market structure, they produce at the point where  $MR = MC$ . This is true for all firms in both the short-run and the long-run.
76. C – There are high barriers to entry and firms interact strategically
77. Graph A represents a monopoly demand curve because it is downward sloping but not vertical
78. Graph B represents a perfectly competitive firm because perfectly competitive firms have perfectly elastic demand curves
79. Output = 600. Find the point where  $MR = MC$ , and go down to find output.
80.  $MC = \$2$ . Find  $MR = MC$ , and go over to find MC.
81.  $TC = \$4,200$
- $TC = ATC \times \text{Output}$   
 $TC = \$7 \times 600$   
 $TC = \$4,200$
82.  $P = \$5$ . Find  $MR = MC$ . Then go up to the demand curve and THEN over to find price.
83.  $TR = \$3,000$
- $TR = \text{Price} \times \text{Output}$   
 $TR = \$5 \times 600$   
 $TR = \$3,000$
84.  $-\$1,200$  loss
- $\text{Profit/Loss} = TR - TC$   
 $\text{Profit/Loss} = \$3,000 - \$4,200$   
 $\text{Profit/Loss} = -\$1,200$
85. Output = 800. Find  $D = MC$ , and go down to find output.

86. 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.

87. \$1.75

Monopoly ATC = \$7

Perfect comp ATC = \$5.25

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

