MICROECONOMICS UNIT 3

Costs & Perfect Competition

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BIG PICTURE IDEAS

#1. The law of diminishing marginal returns states that the additional output produced from hiring an additional worker will eventually decrease .

#2. There are four per-unit short-run cost curves: AFC, AVC, ATC , and MC .

#3. Firms maximize profit when marginal revenue equals marginal cost .

#4. Firms in a perfectly competitive market are price takers because they produce identical products. They also face no barriers to entry and are efficient in the long run.

#5. Other firms enter a market if they can make profit and leave if they make losses . In the long run, perfectly competitive firms earn no economic profit.

Topic 3.1- The Production Function

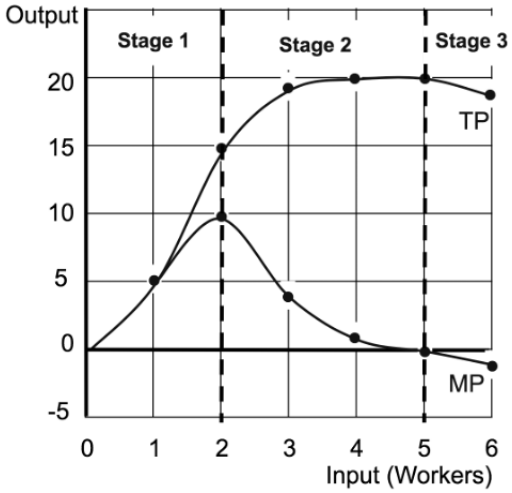
1. The law of diminishing marginal returns occurs because of fixed resources , like capital and land.

2. Complete the chart.

Number of Workers	Total Product (TP)	Marginal Product (MP
0	0	-
1	5	5
2	15	10
3	19	4
4	20	1
5	20	0
6	18	-2

3. After which worker does diminishing marginal returns set in? 2nd worker

4. Plot TP, MP, and identify the 3 stages of returns.



5. Identify the equation for marginal product.

Change in total product
Change in number of inputs

True or False:

6. If the total product increases from 50 to 70 units as a result of hiring two workers, the marginal product is 20 units. False
7. Total product increases at an increasing rate due to specialization. True
8. Total product decreases when marginal product falls. False

Topic 3.2- Short-Run Production Costs

9. Fixed costs DON'T change as more units are produced (e.g. rent, insurance, etc.) and variable costs do change as more units are produced (e.g. wages to workers, raw materials, etc.)

10. Identify the equation for average total cost (ATC).
ATC = TC/Q

11. Identify the equation for average variable cost (AVC).
AVC = VC/Q

12. Identify the equation for average fixed cost (AFC).
AFC = FC/Q

13. Define marginal cost (MC). Additional cost to produce one additional output.

Change in total cost
Change in number of output

14. Average variable cost plus average fixed cost equals average total cost.

15. When MC is below ATC, MC pulls ATC down. When MC is above ATC, MC pulls ATC up.

16. Fill in the blanks for a firm producing boxes of oranges.

Output (boxes)	Variable Cost	Total Cost	MC	AVC	AFC	ATC
0	$0	$10	-	-	-	-
1	$20	$30	$20	$20	$10	$30
2	$30	$40	$10	$15	$5	$20
3	$60	$70	$30	$20	$3.30	$23
4	$100	$110	$40	$25	$2.50	$27.50

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Topic 3.2- Short-Run Production Costs (continued)

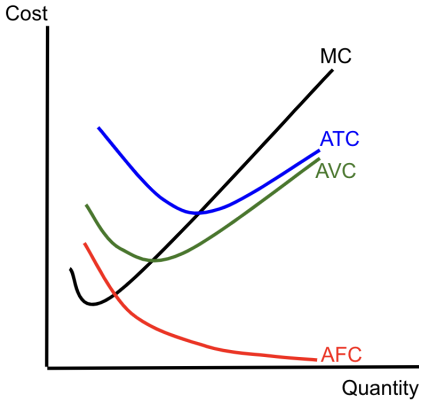
17. For each scenario, identify how each will change (↑, ↓, or no change).

	AFC	AVC	ATC	MC
Fixed costs decrease	↓	NC	↓	NC
Variable costs decrease	NC	↓	↓	↓
Fixed costs increase	↑	NC	↑	NC

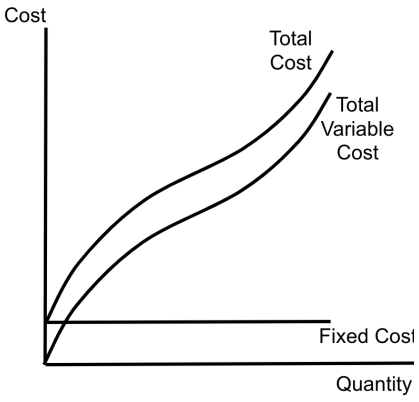
True or False

18. In the short run, all resources are variable. False
19. Total cost increases at a constant rate. False
20. MC always intersects ATC at ATC's minimum. True
21. AFC equals ATC plus AVC. False

22. Draw and label ATC, AVC, AFC, and MC.



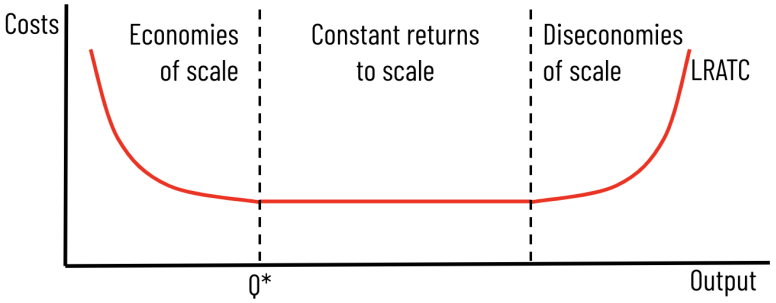
23. Draw and label TC, VC, and FC



Topic 3.3- Long-Run Production Costs

24. In the long run, all resources are variable .
25. Define economies of scale. Long-run average total costs fall because the firm can use cost saving mass production techniques. Getting bigger is cheaper
26. Define diseconomies of scale. Long-run average total costs increase as the firm gets too big and difficult to manage.
27. On the graph to the right, draw the long run ATC and identify economies of scale and diseconomies of scale.

28. Label the minimum efficient scale quantity Q*.



Topic 3.4- Types of Profit

29. Accounting profit is total revenue minus only explicit costs.
30. Economic profit is total revenue minus explicit and implicit costs (including opportunity costs).
31. What is normal profit? Normal profit is no economic profit (breaking even)

True or False:

32. If economic profit is zero, accounting profit is positive. True
33. Profit equals marginal revenue minus marginal cost. False

Topic 3.5- Profit Maximization

Use the table to calculate the following. Assume the price is $15.

Output	Total Cost
0	$10
1	$20
2	$24
3	$30
4	$40
5	$60
6	$90
7	$140

34. What is the profit maximizing quantity? Explain. 4 Units. Produce where MR = MC (without the MC going over MR).
35. How much is the profit or loss? Show work. $20 profit = TR - Total Cost = ($60 - $40)
36. What is the profit or loss if the price increased to $25? Show work. $65 = TR - TC = ($125 - $60). 5 Units will be produced so TR = $125.

Topic 3.6- Short-Run and Long-Run Decisions

37. What is the shutdown rule? A firm should shut down if the price falls below the minimum AVC. It's better to produce nothing and take the fixed costs as a loss instead of continuing to produce and lose even more money.
38. Where is a firm's short-run supply curve? The marginal cost curve above minimum AVC is a firm's short-run supply curve

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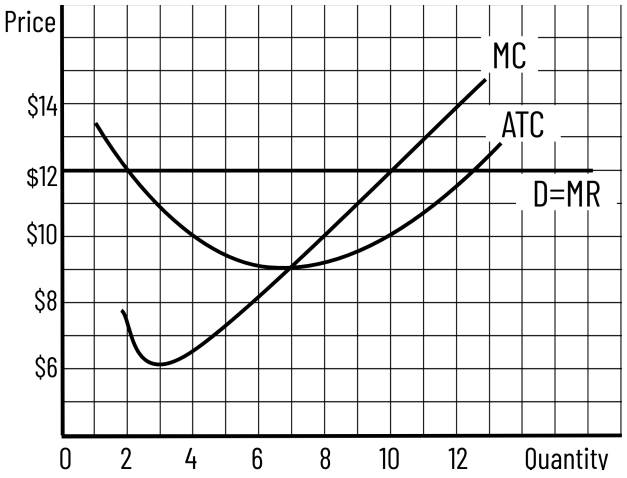
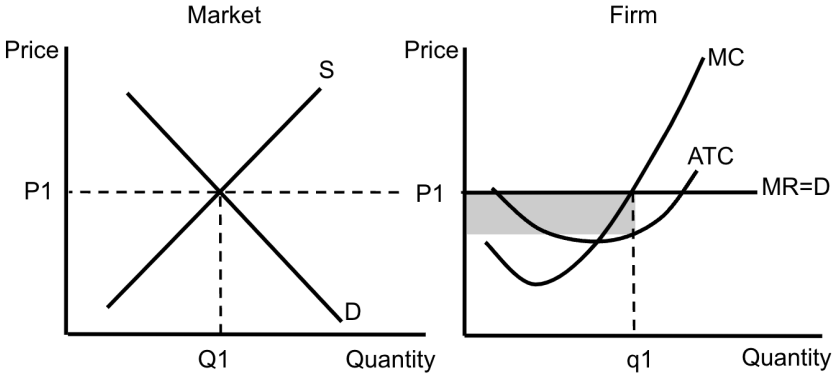
Topic 3.7- Perfect Competition

39. Identify the characteristics of perfect competition. Many small firms, identical products, no barriers to entry, no control over the price (price takers), no economic profit in the long run, efficient in the long run.

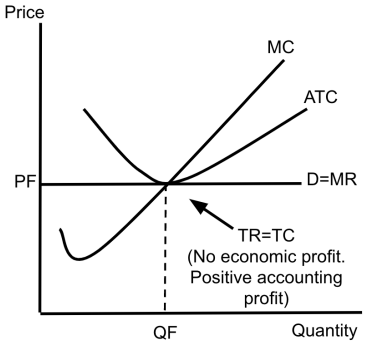
Use the graph to identify the following. Show your work.



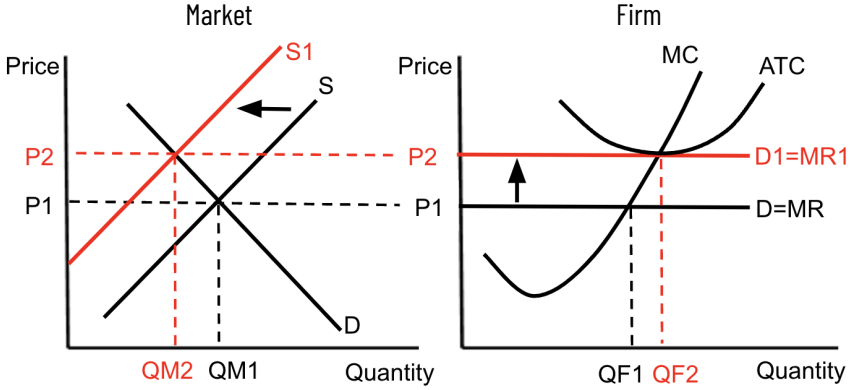
40. Profit maximizing quantity. 10 units where MR=MC
41. Total revenue. $120 = P x Q = $12 x 10
42. Total cost. $100 = ATC x Q = $10 x 10
43. Economic profit. $20 = TR - TC = $120 x $100
44. What will happen to the number of firms in the market in the long run? Explain. Increase. Firms enter since there is profit being made and there are no barriers to entry.
45. Assume the market reaches long run equilibrium. What would be the price and quantity? $9 and 7 units, at the minimum ATC
46. If the price fell to $8, should the firm shut down in the short run? Unknown. You need an AVC curve to know.
47. Draw a perfectly competitive market and firm with the firm making profit. Shade profit.



48. Draw a perfectly competitive firm in long run equilibrium.



49. What must be true if a firm continues to produce when they have a short-run loss? The price must be greater than the AVC since the firm would shut down if the price was less than the AVC.
50. In long run, perfectly competitive firms are allocatively efficient because the price equals the marginal cost.
51. In long run, perfectly competitive firms are productively efficient because output is produced at the lowest cost.
52. In the long-run, firms earn no economic profit, but accounting profit is positive .
53. Show what will happen on both graphs in the long run assuming constant costs.



54. What happened to the price and quantity in the market? P↑ Q↓
55. What happened to the price and quantity for the firm? P↑ Q↑
56. The market price will stay the same from long run to long run in a constant cost industry.
57. The market price will increase from long run to long run in an increasing cost industry.