EE211 Section 1
Homework 4 Answers
Explain your answers with graph in details.

Mankiw, N.G., (2023) **Principles of Microeconomics**, 10th ed., Cengage, (ISBN-13: 978-981-5119-30-5)

Chapter 14
Problems and Applications # 6, 9 and 10

6.

a. The fixed cost is $300, because fixed cost equals total cost minus variable cost. At an output of zero, the only costs are fixed cost.

b.

Quantity	Total Cost	Variable Cost	Marginal Cost (using total cost)	Marginal Cost (using variable cost)
0	$300	$0	---	---
1	350	50	$50	$50
2	390	90	40	40
3	420	120	30	30
4	450	150	30	30
5	490	190	40	40
6	540	240	50	50

Marginal cost equals the change in total cost for each additional unit of output. It is also equal to the change in variable cost for each additional unit of output. This relationship occurs because total cost equals the sum of variable cost and fixed cost and fixed cost does not change as the quantity changes. Thus, as quantity increases, the increase in total cost equals the increase in variable cost.

9.

a. The following table shows average variable cost (AVC), average total cost (ATC), and marginal cost (MC) for each quantity.

Quantity	Variable Cost	Total Cost	Average Variable Cost	Average Total Cost	Marginal Cost
0	$0.00	$30.00	---	---	---
1	10.00	40.00	$10.00	$40.00	$10.00
2	25.00	55.00	12.50	27.50	15.00
3	45.00	75.00	15.00	25.00	20.00
4	70.00	100.00	17.50	25.00	25.00
5	100.00	130.00	20.00	26.00	30.00
6	135.00	165.00	22.50	27.50	35.00

b. Figure A shows the three curves. The marginal-cost curve is below the average-total-cost curve when output is less than four and average total cost is declining. The marginal-cost curve is above the average-total-cost curve when output is above four and average total cost is rising. The marginal-cost curve lies above the average-variable-cost curve.

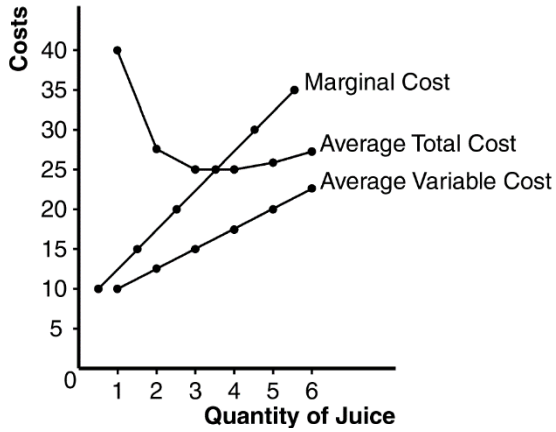

Figure A

10.

The following table shows quantity (*Q*), total cost (*TC*), and average total cost (*ATC*) for the three firms:

	Firm A		Firm B		Firm C	
Quantity	***TC***	***ATC***	***TC***	***ATC***	***TC***	***ATC***
1	$60.00	$60.00	$11.00	$11.00	$21.00	$21.00
2	70.00	35.00	24.00	12.00	34.00	17.00
3	80.00	26.67	39.00	13.00	49.00	16.33
4	90.00	22.50	56.00	14.00	66.00	16.50
5	100.00	20.00	75.00	15.00	85.00	17.00
6	110.00	18.33	96.00	16.00	106.00	17.67
7	120.00	17.14	119.00	17.00	129.00	18.43

Firm A has economies of scale because average total cost declines as output increases. Firm B has diseconomies of scale because average total cost rises as output rises. Firm C has economies of scale from one to three units of output and diseconomies of scale for levels of output beyond three units.