Academic Year: 2018-2019
Year: 3rd
Semester: 1st Semester, Pop Quiz
Exam Date: October 16, 2018

Course Name: Mathematical Economics (Group 1) Dr. Ashraf Samir	Course Code: E305	Exam pages: 1

1) If you have the following cost function: C=C(Q)

- Find the relationship between marginal cost and average cost when average cost is increasing, decreasing, reaching minimum.

2) Given the following total cost function: $C = Q^3 + 12Q^2 + 60Q$

a) Find the marginal and average functions.
b) Graph the results by depicting the vertical intercept and the intersection between the marginal and the average functions.

3) **If you have the following average revenue functions: $AR = f(Q)$,**

- Prove that: the difference between marginal and average revenue will always be the quantity multiply by the slope of the average revenue.

4) Given the following average-cost function: $AC = Q^2 - 4Q + 174$,

a) Find the marginal cost.
b) Is the given function more appropriate as a long-run or a short-run functions? Why?

5) Given the following average revenue function: $AR = 15 - Q$,

- Find the marginal revenue.

6) Given the following total revenue function (R) and product function (Q) of a firm:

$$R = f(Q) \text{ and } Q = g(L),$$

- By using Chain Rule, derive the marginal revenue product of labor.

7) If you have the following revenue function of a firm working in a manufacturing sector: $R = f(Q) = 30Q - 2Q^2$. And, if you know that the short-run production function was described by the following function: $Q(L) = 20L^2$.

- Find the marginal revenue product of labor.

8) Consider the following short-run production function of a firm A:

$$Q = 6L^2 - 0.4L^3$$

- Find the value of labors that maximizes output.