ECO 113: Review Questions

Purpose

The purpose of the questions is allow students revise for the upcoming examination next week. A few of the questions will also serve as a second CAT to be submitted a week after the end of the examinations although it will be fine to submit even earlier through the email johnkaruitha14@outlook.com.

From my experience, students tend to ignore theoretical concepts like definitions which is a mistake at this level.

Again note that these questions just serve as a sample of the level the exam will be at and do not replicate the actual exam. Please review all the topics thoroughly.

Question one

a. Define the following terms.

- Column matrix.
- Row matrix.

b. Use the crammers rule to solve the follwing system of equations.

$x + 2y = 5$

$2x - y = 0$

Question two

Break-even and profit maximization A certain company has fixed costs of Ksh. 15,000 for its product and variable costs given by $140 + 0.04x$ Shillings per unit, where x is the total number of units. The selling price of the product is given by $300 - 0.06x$ Shillings per unit.

a. Formulate the functions for total cost and total revenue (in other words what is the cost and revenue associated with producing and selling x units, respectively. Note total cost = cost per unit * number of units).
b. Find the break-even quantities.
c. Find the level of sales that maximizes revenue (here, you can use differentiation).
d. Form the profit function and find the level of production and sales that maximizes profit.
e. Find the profit (or loss) at the production levels found in parts (c) and (d).

Question three

Suppose a calculator manufacturer has the total cost given by the equation;

$c(x) = 85x + 3300$

The total revenue is $R(x) = 385x$

a. What is the profit function for the computer company?
b. How many computers must the company sell to avoid losing money?
c. What is the profit/loss from the sale of 400 computers?

Question four

Suppose that a certain product has the following demand and supply functions.

a. Demand $60p + q = 2100$
b. Supply $120p - q = 540$

If a Ksh 0.50 tax per item is levied on the supplier, who passes it on to the consumer as a price increase, find the market equilibrium point after the tax.

Question five

A look at the industrial sector of an economy can be simplified to include three industries: the mining industry, the manufacturing industry, and the fuels industry. The technology matrix for this sector of the economy is given by

$$[A] = \begin{bmatrix} 0.4 & 0.2 & 0.2 & mining \\ 0.2 & 0.4 & 0.2 & manufacturing \\ 0.1 & 0.2 & 0.2 & fuels \end{bmatrix}$$

Find the gross production of each industry if surpluses of 72 units of mined goods, 40 units of manufactured goods, and 220 units of fuels are desired.

Question six

Evaluate the following derivatives and integrals.

a. Find $y' = \frac{dy}{dx}$ for the function $y = \frac{(3x+1)^2}{x^2-4}$.
b. Find $y' = \frac{dy}{dx}$ for the function $y = (\frac{x+1}{1-x^2})^3$.

c) Evaluate the following integrals

d) $\int_{-3}^{2}(x^2+4)\,dx$.

ii) $\int_{0}^{2}\frac{x^2}{4}\,dx$.