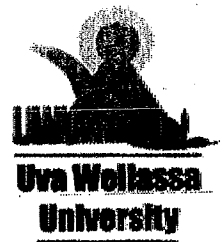


Uva Wellassa University
Faculty of Management
Degree of Bachelor of Business Management in Entrepreneurship and
Management



FIRST YEAR FIRST SEMESTER EXAMINATION – JUNE / JULY 2017

ENM 161 – 2 Business Mathematics

Instructions to candidates:

No. of pages : Three (03)
No. of questions : Six (06) Essays
Time : Two (02) Hours
Marks allocated : 100 Marks

Calculators can be used

Answer any **four (04)** questions.

(01).

(a). Simplify the followings using rules of exponents.

(2 marks for each)

i). $(x^2) \left(x^{\frac{1}{2}}\right)$

ii). $\frac{x^3}{x^{-4}}$

iii). $\frac{x^3}{\sqrt{x}}$

iv). $\left(\frac{1}{x^5}\right) \left(\frac{1}{y^5}\right)$

v). $(x^4)^{-2}$

(b). Solve the following quadratic equations.

(5 marks for each)

i). $5x^2 + 23x + 12 = 0$

ii). $3x^2 - 41x + 26 = 0$

(c). Find the Q_D , Q_S , and P using the following equations.

(5 marks)

$Q_S = -20 + 3P$

$Q_D = 220 - 5P$

(Hint: at the equilibrium $Q_D = Q_S$)

(Total 25 marks)

(02).

(a). Find $A + B$ given the following matrices

(4 marks for each)

i). $A = \begin{bmatrix} 9 & 4 \\ 2 & 7 \\ 3 & 5 \\ 8 & 6 \end{bmatrix}_{4 \times 2}$

$B = \begin{bmatrix} 1 & 3 \\ 6 & 5 \\ 2 & 8 \\ 9 & 2 \end{bmatrix}_{4 \times 2}$



$$\text{ii). } \mathbf{A} = \begin{bmatrix} 0 & 8 & 2 & 7 \\ 5 & 5 & 3 & 5 \\ 6 & 3 & 8 & 6 \end{bmatrix}_{3 \times 4} \quad \mathbf{B} = \begin{bmatrix} 5 & 5 & 2 & -3 & 2 \\ -1 & 5 & 4 & 6 & 4 \\ 0 & 3 & 1 & 4 & 6 \end{bmatrix}_{3 \times 5}$$

(b). Find the product of the following matrices.

(5 marks)

$$\mathbf{A} = \begin{bmatrix} 2 & 1 & 5 \\ 3 & 2 & 6 \\ 1 & 4 & 3 \end{bmatrix}_{3 \times 3} \quad \mathbf{B} = \begin{bmatrix} 10 & 1 & 2 \\ 5 & 3 & 6 \\ 2 & 1 & 2 \end{bmatrix}_{3 \times 3}$$

(c). Show that $\mathbf{AB} = \mathbf{BA}$ using the above matrices in part (b).

(5 marks)

(d). Find $\mathbf{AB}$ for the following matrices and explain why the $\mathbf{AB}$ is unique according to matrix algebra.

(7 marks)

$$\mathbf{A} = \begin{bmatrix} 6 & -12 \\ -3 & 6 \end{bmatrix}_{2 \times 2} \quad \mathbf{B} = \begin{bmatrix} 12 & 6 \\ 6 & 3 \end{bmatrix}_{2 \times 2}$$

(Total 25 marks)

(03).

(a). Find the transpose of the following matrix $\mathbf{A}$.

(5 marks)

$$\mathbf{A} = \begin{bmatrix} 11 & 4 & 3 \\ 6 & -2 & 0 \\ 8 & 3 & 9 \end{bmatrix}_{3 \times 3}$$

(b). The equilibrium condition of three related markets is given below.

$$\begin{aligned} 11P_1 - P_2 - P_3 &= 31 \\ -P_1 + 6P_2 - 2P_3 &= 26 \\ -P_1 - 2P_2 + 7P_3 &= 24 \end{aligned}$$

Find the equilibrium prices for each market using matrix inversions. (20 marks)

(Total 25 marks)

(04).

(a). Find the limits for the following functions.

(3 marks for each)

$$\text{i). } \lim_{x \rightarrow 4} \frac{3x^2 - 5x}{x + 6}$$

$$\text{ii). } \lim_{x \rightarrow 2} \sqrt{6x^3 + 1}$$

$$\text{iii). } \lim_{x \rightarrow 2} \frac{3x^2 + 3x - 18}{x - 2}$$

$$\text{iv). } \lim_{x \rightarrow 3} \frac{x - 3}{x^2 - 9}$$

(b). If the slope of a function can be estimated by $\lim_{\Delta x \rightarrow 0} \frac{f(x_1 + \Delta x) - f(x_1)}{\Delta x}$, and the original function is given as $6x^2$, find the slope of the given function. (8 marks)

(c). "The power function rule is the most important rule in differentiation". Do you agree with this statement? Justify your answer by providing examples.

(5 marks)

(Total 25 marks)

(05).

(a). Differentiate the following functions.

(4 marks for each)

i). $R = 8t^2 + 5t - 6$

ii). $Q = 12p^4 + 3p^3 + 25p - 12$

iii). $y = (x^3 + 2x)(x^2 + 25x)$

iv). $Z = \frac{10y^5 - 12y^4}{2y + 5y^3}$

v). $y = 25x^3(10x^2 - 2)^5$

(b). If $R = 5t^3 - 3t^2i^2 + 7i^5$, find; $\frac{\partial R}{\partial t}$ and $\frac{\partial R}{\partial i}$.

(5 marks)

(Total 25 marks)

(06).

Write short notes on any 5 (five) of the followings.

(a). Diagonal Matrix

(b). Cramer's Rule

(c). Chain Rule

(d). Stationary Points of a Function

(e). Definite Integration

(f). Riemann Sum

(g). Compound Interest Calculations

(h). Discounting under Annual, Multiple and Continuous Compounding

(Total 25 marks)

