



**BOWEN UNIVERSITY, IWO**  
**COLLEGE OF MANAGEMENT AND SCIENCES**  
**ECONOMICS PROGRAMME**  
**B.Sc. DEGREE 2022/2023 ACADEMIC SESSION**  
**SECOND SEMESTER EXAMINATION**

Course code: ECN 104

Course credit: 3

Course title: Introductory Mathematics for Economics II      Time allowed: 3 hours

Instruction: Provide your answers systematically and show your workings step by step.

**Section A: Attempt all questions in this section. Each questions attract 1 mark [25 marks]**

1. When multiplying powers with the same base, keep the base and .....the exponents
2.  $x^2 + xy - y = 1$  is an example of a/an ..... function
3. The mathematical statement that involves setting two algebraic expressions equal to each other is regarded as .....
4. Given  $Q = a + bP$ , identify the slope, the intercept, the dependent and independent variable of the function.
5. Using the exponential form, the .....of a power indicates how many times the base multiplies itself
6. Evaluate  $f(3)$ , given  $f(x) = 4x^2 - 3x + 12$
7. The ..... of a matrix is obtained by interchanging the rows and columns of the original matrix.
8. The formula for the quotient rule when differentiating with respect to  $x$  is written as ...
9. If  $y = f(x) = C$ , where  $C$  is an arbitrary constant, then  $\frac{\partial y}{\partial x} = f'(x) = ?$
10. .... is obtained by multiplying the two elements in the principal diagonal of  $A$  and then subtracting the product of the two remaining elements.
11. Find the value of  $x$  using the quadratic formula  $3x^2 - 41x + 26 = 0$

For question 12 – 16, identify the degree of each terms of the following polynomials

12.  $2x^3y + x^2y + 7x$
13.  $10x^5y^5 + 4xy + 3$
14.  $8y + x^2y + 7x$
15.  $3x^2y - 41x^2 + 26$
16.  $2x^3y + 9x^2y$

For question 17 -22, state whether the following statements are True or False

17. A non-linear equation is usually represented by a straight line graph
18. All identity matrices are square matrices
19. All square matrices are identity matrices
20. The order of a column matrix is generally denoted as  $r \times 1$ .
21. The order of a matrix is the same as the position of each elements in a matrix

22. All square matrices have determinant

Solve the following exponents

23.  $\left(\frac{35a^5b^7}{7a^2b^3}\right)^3 =$

24.  $\left(\frac{x^4y^6}{x^2y^2}\right) =$

25.  $(7s^{-4}t^3)^{-5} =$

**Section B: Attempt any 3 questions in this section. Each questions attract 15 marks**

1. (a). Solve for the unknown in the system of equations below using either the substitution or elimination method

$$18x - y = 87$$

$$-2x + 36y = 98$$

(5 marks)

- (b). Expand the following polynomials

(i)  $(3x + 6y)(x^4 + 10x - 15)$

(ii)  $(2x^2 + 6)(x - 5)$

(5 marks)

(c). Solve for  $x$  in the equation  $5x + A = B$  where  $A = \begin{bmatrix} 14 \\ 15 \\ 6 \end{bmatrix}$  and  $B = \begin{bmatrix} 44 \\ 15 \\ 1 \end{bmatrix}$  (5 marks)

2. (a). With the aid of examples, explain each of the following types of matrices:

(i) Scalar matrix (ii) Diagonal matrix (iii) Upper and lower triangular matrix (iv) Symmetric matrix (v) Square matrix (10 marks)

- (b) Differentiate between an implicit and an explicit function, with examples (5 marks)

3. Find the derivative of the following functions

(i)  $y = 2x^3 + x^2 + 7$  (3 marks)

(ii)  $y = 4x^5/(1 - 3x)$  (3 marks)

(i)  $y = 5x^4(3x - 7)$  (3 marks)

(ii)  $y = (2x + 3)^{10}$  (3 marks)

(iii)  $y = (4x - 2)(2x + 5y)$  (3 marks)

4. Given the matrices  $A = \begin{bmatrix} 4 & 7 & 2 \end{bmatrix}$ ,  $B = \begin{bmatrix} 6 \\ 5 \\ 1 \end{bmatrix}$  and  $C = \begin{bmatrix} 9 \\ 5 \\ 8 \end{bmatrix}$ .

a. Verify that  $A(B + C) = AB + AC$  (5 marks)

b. If  $K = 2$ , prove that  $k(A + B) = kA + kB$  (5 marks)

c. Find  $4B + \frac{1}{2}C$  (5 marks)