



**BOWEN UNIVERSITY, IWO**  
**(OF THE NIGERIAN BAPTIST CONVENTION)**  
**COLLEGE OF MANAGEMENT AND SOCIAL SCIENCES (COMSS)**  
**BUSINESS ADMINISTRATION PROGRAMME**

**B.Sc. Bus. Admin. Degree, B Sc. Accounting Degree and B Sc. IRPM Degree**  
**2023/2024 SECOND SEMESTER EXAMINATION**

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**COURSE CODE:** AMS 102  
**COURSE TITLE:** Basic Mathematics  
**CREDIT:** 2  
**TIME:** 2 Hours  
**INSTRUCTIONS:** Answer question 2 and any other two questions  
**DATE:** June 2024

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1. (a) Provide two polynomial expressions and indicate their degrees (3 Marks)  
(b) Find the range of values of  $x$  that satisfy the following inequalities
  - (i)  $(x - a)(x - b) < 0$ , for  $a \geq b$  (4 Marks)
  - (ii)  $x^2 - 5x + 6 \geq 0$  (6 Marks)
  - (iii)  $3x^3 + 10x^2 - 23x + 30 \geq 0$  (7 Marks)
2. (a) show that  $\tan 3A = \frac{\tan A + \tan B}{1 - \tan A \tan B}$  (6 Marks)  
(b) Show that  $\cos 3A = 4\cos^3 A - 3\cos A$  (6 Marks)  
(c) Without using tables, evaluate  $\sin 15^\circ$  (4 Marks)  
(d) Use mathematical induction to show that  $1 + 3 + 5 + \dots + 2n - 1 = n^2$  (6 Marks)  
(e) Let  $A =$  last 4 digits of your matriculation number  
 $B = \{2, 5, 7, x\}$  where,  $x$  is the last digit of your matriculation number
  - (i) list the elements in  $A$  and  $B$
  - (ii) Show that  $A \cap B^c = A^c \cup B^c$  (8 Marks)
3. (a) Divide  $2x^3 + 9x^2 - 6x - 40$  by (a)  $x + 4$  (7 Marks)  
(b) Multiply  $(2x - 1)(3x + 2)(x - 3)$  (6 Marks)  
(c) Resolve  $\frac{5x-9}{(x^2-2x-15)}$  into partial fractions (7 Marks)
4. Tolumide Plc is a monopolist firm owned by Tolu and Ayomide. The firm's demand curve is  $2p - 56 + q = 0$  and its total cost function is:  $TC - 2.5q^2 + 20q - 90 = 0$   
Determine the price and quantity for which Revenue is maximised (4 Marks)  
Determine the price and quantity for which Profit is maximised (6 Marks)

Comment on your findings in (i) and (ii)

(4 Marks)

Verify that when profit is maximum marginal revenue equals marginal cost (6 Marks)

5. (a) IretomiFunmiBorah (IFB) is a multinational consulting company owned by Iretomiwa, Tofunmi and Deboral. SeyiKintanKunle, a government agency controlled by Oluwaseyi, Adekintan and Adekunle has asked IretomiFunmiBorah to survey fifty- (50) 100 level students in Accounting, Business and IRPM at Bowen University to examine their course preferences. 4Y said they like AMS 102, 3Y said that they like AMS 104 and another 3Y like Bus 119. Furthermore, 1Y of them like the three courses, 20 like AMS 102 and AMS 104, 22 like AMS 102 and Bus 119 while 19 like AMS 104 and Bus 119. After turning in the results, they fired IFB. Do you think that this is fair?

(8 Marks)

**Note: (1) Y is the last digit of your matriculation number**

- (b) Use mathematical induction to show that  $1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2}$  (4 Marks)

(c) (i) The demand function of a firm is given by  $P = 96 - 6q$  and equilibrium quantity is 14. Compute the consumer surplus (4 Marks)

(ii) The supply function of producers is given by  $P = 60 + 15q$  and equilibrium price is N70. Compute the producer surplus (4 marks)