

COSC 0172: MATHEMATICS FOR COMPUTING II

INSTRUCTIONS:

Answer all questions in section A and any other two in section B

Do not write anything on the question paper

Non-programmable electronic calculators may be used

SECTION A

QUESTION ONE (30 marks)

a) Given $B = \begin{pmatrix} 4 & 11 & 5 \\ 1 & 4 & 2 \\ 1 & 2 & 1 \end{pmatrix}$, Find B^{-1} (3 marks)

b) Hence, solve the simultaneous equations (3 marks)

$$4x + 11y + 5z = 2$$

$$X + 4y + 2z = 1$$

$$X + 2y + z = 4$$

c) Find the mean and the standard deviation of the data (6 marks)

Class interval	F
0-2	1
3-5	6
6-8	10
9-11	7
12-14	0
15-17	2

d) Solve for x in the linear inequality $2(4x+2)-20 > 8(2x-3)$ (3 marks)

e) Distinguish between conditional probability and empirical probability. (4marks)

f) Find the quotient and the remainder in the following equation $x^4 + x^3 - 17x^2 - 20x + 32$ Divided by $x - 4$ (5 marks)

g) Graph the following linear inequalities $2x - 5y \leq 10$, $x + 2y \leq 8$, $x \geq 0$, $y \geq 0$

- h) State three advantages and three demerits of arithmetic mean (3 marks)
- (3 marks)

SECTION B

QUESTION TWO (20 MARKS)

- a) The question “do you pray?” was asked of 50 people and the results were as shown in the table

Respondents	Yes	No	Total
Male	17	10	27
Female	14	9	23
Total	31	19	50

Required;

- i) What is the probability of randomly selecting an individual being a male who pray? (2 marks)
 - ii) What is the probability of randomly selecting an individual being a male who don't pray? (2 marks)
 - iii) What is the probability of randomly selecting an individual who pray? (2 marks)
 - iv) What is the probability of randomly selecting a male or a female who pray? (2 marks)
 - v) What is the probability of randomly selecting female who pray? (2 marks)
- b) Solve the following inequalities graphically and identify the unwanted regions

$$2x \leq y + 6$$

$$x + y \leq 4$$

$$y \geq x + 9$$

$$0.5x \leq 2y + 4$$

$$y > 3$$

(10 marks)

QUESTION THREE (20 MARKS)

- a) Use the data given to find D_7 , P_{69} , mean, median, semi-interquartile range, MAD and Standard deviation. (14 marks)

Class interval	F
0-9	5

10-19	8
20-29	7
30-39	12
40-49	28
50-59	20
60-69	15
70-79	5

b) Show that $x+3$ is a factor of $x^3 + 6x^2 - x - 30$. Find the remaining factors. (6 marks)

QUESTION 4 (20 MARKS)

a) State the properties of a good measure of central tendency (5 marks)

b) Given $A = \begin{pmatrix} 4 & 1 & 8 \\ -2 & 4 & 2 \\ 3 & 4 & 2 \end{pmatrix}$, $B = \begin{pmatrix} 1 & -1 & 3 \\ 1 & 0 & 1 \\ 1 & 1 & 3 \end{pmatrix}$, Find

A^{-1} , B^{-1} and AB (9 marks)

c) If we have 12 soft-centered and 8 hard-centered chocolates in a box, draw a tree diagram and use it to find;

i) $P(\text{soft-centered and soft-centered})$ (2 marks)

ii) $P(\text{hard-centered and hard-centered})$ (2 marks)

iii) $P(\text{hard-centered soft-centered or soft-centered hard-centered})$ (2 marks)