BISHOP'S SENIOR SCHOOL MUKONO
S.3 MATHEMATICS PAPER
TIME: 2 ½ hours

INSTRUCTIONS:-

- Attempt all questions in section A and any three questions from section B.
- Show all the necessary working.
- Non-programmable scientific calculators may be used.

SECTION A:

1. Solve ; $\frac{7x+1}{9} + \frac{3x-1}{7} = 2.$ (4mks)

2. Given that $212_n = 25_{nine}$. Find the base that n represents. (4mks)

3. A point P is mapped onto P'(7,5) by a translation given by $\binom{1}{4}$. Determine the coordinates of point P. (4mks)

4. By shading the unwanted region show the region satisfied by the inequality ; $3x - y \leq 0$. (4mks)

5. Given that A = $\begin{pmatrix} 2 & -1 \\ 4 & -1 \end{pmatrix}$ find A^{-1}. (4mks)

6. A box contains green, blue and red balls. The probability of picking a green ball from the box is $^1/_5$ and that of a blue ball is $^1/_2$. What is the probability of picking a red ball from the box? (4mks)

7. Given that $f(x) = ax^2 + bx$, $f(1) = 5$ and $f(2) = 14$. Find the values of a and b. (4mks)

8. Find the equation of a line that picks through (2, -1) and is perpendicular to $3y = x + 4$. (4mks)

9. Use tables of logarithm to evaluate 78.5 : 0.00453.

10. Make n the subject of the expression; $\frac{m+n}{n-3m} = \frac{p}{q}$. (4mks)

SECTION B:

11. Draw the graphs of $y = 2x^2 + 3x - 3$ and $y = 7x - 3$ for $-3 \leq x \leq 3$. Using scale of 1 cm : 2 units on the vertical axis and 2cm : 1 unit on the horizontal axis . Use your graph to;

i) Solve the equation; $2x^2 + 3x - 3 = 0$
ii) Find the points of intersection of the line and the curve. (12mks)

12.a) If A = $\begin{pmatrix} 1 & 3 \\ 4 & 5 \end{pmatrix}$ and B = $\begin{pmatrix} 3 & -2 \\ 5 & 9 \end{pmatrix}$ find;

i) A + B. (ii) AB. (iii) B – A. (7mks)

b) Use matrix method to solve the following simultaneous equation;

$5x - y = 8.$
$X + y = 10.$ (5mks)

13. In a certain school there are 87 students in S.3, of these 43 play Hocky(H), 42 play Foot-ball(F) and 47 play Volley ball(V). 17 play V and F, 21 play H and F and 15 play H and V. Each students plays at least one of the three games.

a) Represent the information on a vain-diagram.
b) Find the number of students who play all the 3 games.
c) What is the probability that a student picked at random play only one game. (12mks)

14. The table below shows the weight in kg of 30 pupils.

48	44	33	52	54	44
53	38	37	35	53	46
59	51	32	37	49	42
48	59	52	40	54	46
45	62	35	54	48	35

a) Comment a frequency table with clashes starting with 30 – 34.

b) Use your table in (a) to;
i) Estimate the mean.
ii) Draw an orgive and use it to estimate the median weight. 12mks)

- **END** -

BISHOP'S SENIOR SCHOOL MUKONO
S.3 MATHEMATICS.
TIME: 2 ½ HOURS

INSTRUCTIONS:-

- Attempt all questions in section A and Section B.
- All necessary calculations should be shown as the rest of the answers.
- Silent non-programmable scientific calculator may be used.
- Graph papers are provided.

SECTION A: (40 Marks)

1. Given that; a * b = $a^2b - ab^2$. Find the value of (3 + 2)* 4. (4mks)

2. Solve for x in the equation ; $3^{x+2} = 27^{2x-1}$. (4mks)

3. If M = $\begin{pmatrix} 5 & 0 \\ 1 & 6 \\ 2 & -1 \end{pmatrix}$ and N = $\begin{pmatrix} 1 & -4 & 2 \\ 2 & -1 & 3 \end{pmatrix}$. Find $(MN)^{-1}$. (4mks)

4. Given that f(x) = $ax^2 + 4x$ and f(3)=2; find the value of a. Hence find f(-1). (4mks)

5. Express $\frac{\sqrt{2}-1}{\sqrt{2}+1}$ in the form as $\sqrt[b]{c}$. (4mks)

6. Given that t = $\sqrt{\frac{a-b}{1+ab}}$ make b the subject of the fomular. (4 mks)

7. If $113_x = 45_{ten}$. Find the values of x. (4mks)

8. Find the equation of a line that passes through (2, 1) and is parallel to the line
   3y + 2x + 4. (4mks)

9. Given $\underset{\sim}{a} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$ and $\underset{\sim}{b} = \begin{pmatrix} -3 \\ 5 \end{pmatrix}$. Find $\left|\underset{\sim}{a} - 2\underset{\sim}{b}\right|$. (4mks)

10. On a map. a forest area 75km^2 is represented by 12cm^2, find the

representative fraction on the map. (4mks)

SECTION B: (60 Marks)

11. The table below shows marks scored by 42 students in a test.

35	49	69	57	58	75	48
40	46	86	47	81	67	63
56	80	36	62	49	46	26
41	58	68	73	65	59	72
64	70	64	54	74	33	51
73	25	41	61	56	57	28

a) Starting with the mark of 25 and using equal intervals of 10 , make a frequency distribution table and calculate the mean mass. (7mks)

b) Draw a histogram and use it to estimate the model mark. (5mks)

12.a) Given the equation of the curve $y = 2x^2 + 5x - 3$; draw the graph of values of $x - 4 \leq x \leq 2$. (4mks)

b) On the same axes and using the same scale, plot the graph of y = 2(x + 1). (Use 2cm : 1unit on the x-axis and 1cm : 1 unit on the y-axis)

c) Use your graphs to solve the equations;-

i) $2x^2 + 5x - 1 = 0$. (ii) $x^2 + 2x - 2 = 0$. (8mks)

13.a) If $\begin{pmatrix} n+4 & 3 \\ 4 & n \end{pmatrix}$ is singular, find n. (4mks)

b) Sarah bought 3kg of rice, 4kg of beans and 5kg of sugar. Joan bought 3kg of rice and 2kg of sugar while Ronald bought 3kg of beans and 4kg of sugar. Given that the last of 1kg of rice, beans and sugar are Shs.2,500, Shs.2,000 and Shs.3,000 respectively;-

a) Write down a;

i) 2 x 3 matrix for the items bought.

ii) 3 x 1 cost matrix. (2mks)

b) Find the total expenditure of each individual above by combining the two matrices above. (6mks)

14. Using a ruler, a pencil and a pair of compasses only;

a) Construct a triangle ABC, with AB = 8cm, BC = 12cm and angle BAC = 120^o.

b.i) Draw a perpendicular line to BC from A. The perpendicular meets BC at point D.

ii) Measure the distance AD and find the area of triangle ABC.

d) Inscribe a circle in the triangle ABC and measures its radius. (12mks)

15.a) Solve the equation; $\log_{10} 4y - 3 + \log_{10} 3 = \log_{10} 2y + 1$. (4mks)

b) Solve for x in $\frac{x+6}{5} - \frac{2x-5}{15} = \frac{1-x}{3}$. (4mks)

c) Use tables of logarithm to evaluate; $\frac{0.00721\ x\ 62.02}{0.45}$. (4mks)

16. A group of 90 students were asked which books they had read in the following list;

A: Animal farm, B: the Burdens, C:Weep no child.

40 had read A, 35 had read B and 16 had read C. 7 had all the three books,

20 had read A and B only, 2 had read B and C only and 1 had read A and C only.

a) Illustrate this information on a venn-diagram. (6mks)

b) Determine the number of students who had read;-

i) Only one of these books.

ii) None of these books. (4mks)

17. a) If matrix A = $\begin{pmatrix} 1 & 3 \\ 4 & 2 \end{pmatrix}$, Find the matrix B such that BA = $\begin{pmatrix} -2 & -2 \\ 3 & 4 \end{pmatrix}$. (4mks)

b) Use matrix method to solve the following pair of simultaneous equations.

2x – 3y + 5 = 0

Y + 4x = 5. (4mks)

c) If P = $\begin{pmatrix} 1 & 3 \\ 4 & 2 \end{pmatrix}$ and Q = $\begin{pmatrix} 5 & 1 \\ -1 & 0 \end{pmatrix}$, find $(p + q)^2$. (4mks)

- **END -**