

Name: MARKING Scheme Class: ..... Adm.No.....  
 School: ..... Date: .....  
 Sign:.....

121/1  
 MATHEMATICS  
 PAPER 1  
 DECEMBER 2021  
 TIME: 2 ½ HOURS

**MOKASA II JOINT EXAMINATION - 2021**

**Kenya Certificate to Secondary Education**

**MATHEMATICS (PAPER 1)**

**TIME: 2 ½ HOURS**

**Instructions**

- Write your name, class, admission number, school, date and signature in spaces provided above.
- The paper contains **two** sections **A** and **B**.
- Answer **all** questions in section **A** and **any five** questions from section **B** in the spaces provided below each question.
- Show all the steps in your calculations giving your answers at each stage in the spaces below each question.
- Non-programmable silent electronic calculator and mathematical tables may be used except where stated otherwise.

**For Examiner's Use Only**

**SECTION A**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL

**SECTION B**

17	18	19	20	21	22	23	24	TOTAL

PERCENTAGE  
SCORE

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# MARKING SCHEME PAPER 1

## MOKASA 2

### SECTION A

Answer **all** questions in this section in the spaces provided

1. The sum of two numbers exceeds their product by one. Their difference is equal to their product less five. Find the two numbers. **(3 marks)**

$$\begin{aligned} \text{(i)} \quad xy &= xy - 1 \\ \text{(ii)} \quad x - y &= xy - 5 \end{aligned} \quad \left. \begin{array}{l} \text{---} \\ \text{---} \end{array} \right\} \begin{array}{l} \text{M1 for Both} \\ \text{M1 for elimination} \\ \text{A1 for Both} \end{array}$$

$$\begin{aligned} 2y &= 4 \\ y &= 2 \\ x &= 3 \end{aligned}$$

3

2. Musa has twenty shillings more than Aisha. After he spends a quarter of his money and Aisha  $\frac{1}{5}$  of hers, they find that Aisha has 10 shillings more than Musa. How much money did both have? **(4 marks)**

Let Aisha have  $x$   
Musa  $x + 20$  } - B1

$$\frac{4}{5}x - 10 = \frac{3}{4}(x + 20) \quad \text{--- M1}$$

$$\frac{4}{5}x - \frac{3}{4}x = 15 + 10$$

$$\frac{x}{20} = 25 \quad \text{--- A1}$$

$$x = 500 \quad \text{--- A1}$$

3

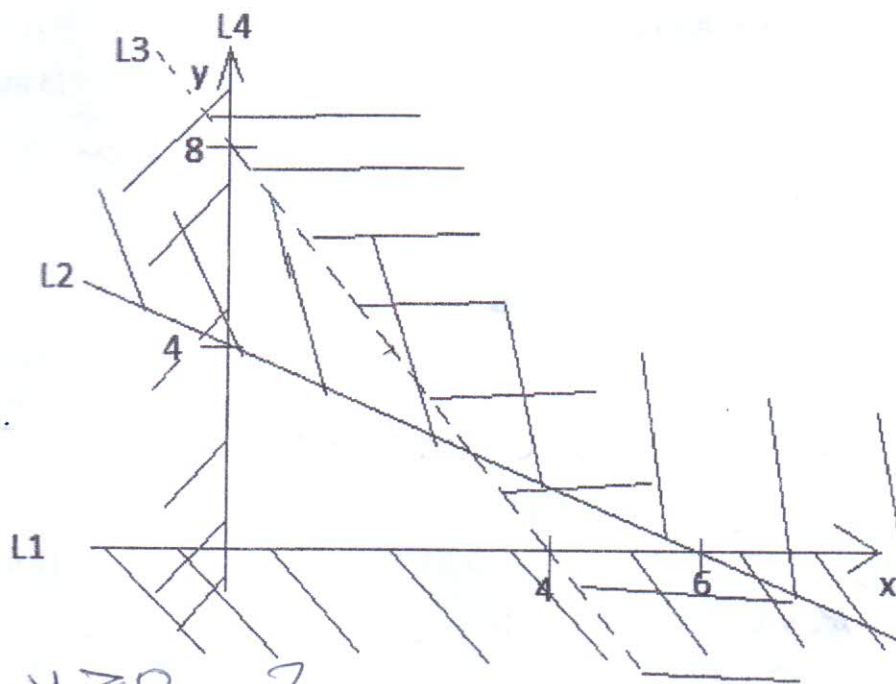
$\therefore$  Aisha have KSh. 500, Musa KSh 520  
Both KSh 1020 Accept

3. The number 2942m08 is divisible by 11. Find the least value of  $m$  and the square of  $m$ . **(3 marks)**

$$\begin{aligned} 9 + 2 + 0 &= 11 \\ 2 + 4 + m + 8 &= 14 + m \\ (14 + m) - 11 &= 0 \\ 14 + m &= 22 \quad \text{--- M1 or equivalent} \\ m &= 22 - 14 \\ m &= 8 \quad \text{--- A1} \\ m^2 &= 64 \quad \text{--- B1} \end{aligned}$$

3

4. Give the inequalities L2, L3 and L4 which define the region R in the inequalities shown below. (3 marks)



$$L1 \Rightarrow y \geq 0$$

$$L4 \Rightarrow x \geq 0$$

} ————— B1 for Both.

$$L2 \Rightarrow \frac{x}{6} + \frac{y}{4} = 1 \times 12$$

$$2x + 3y \leq 12$$

————— B1

$$L3 \Rightarrow \frac{x}{4} + \frac{y}{8} = 1 \times 8$$

$$2x + y \leq 8$$

————— B1

③

5. Given  $P = \begin{pmatrix} 2 & 0 \\ -2 & 1 \end{pmatrix}$ ,  $Q = \begin{pmatrix} 4 & -1 \\ 3 & 2 \end{pmatrix}$  and  $R = \begin{pmatrix} 2 & -1 \\ -4 & 5 \end{pmatrix}$ , find  $PQ + R$ .

(3 marks)

$$\begin{pmatrix} 2 & 0 \\ -2 & 1 \end{pmatrix} \begin{pmatrix} 4 & -1 \\ 3 & 2 \end{pmatrix} = \begin{pmatrix} 8 & -2 \\ -5 & 4 \end{pmatrix}$$

————— M1

$$\begin{pmatrix} 8 & -2 \\ -5 & 4 \end{pmatrix} + \begin{pmatrix} 2 & -1 \\ -4 & 5 \end{pmatrix} = \begin{pmatrix} 10 & -3 \\ -9 & 9 \end{pmatrix}$$

M1 A1

③

6. A Kenyan businessman bought goods from Japan worth 2,900,000 Japanese Yen. On arrival in Kenya, custom duty 10% was charged on the value of the goods. If the exchange rates were as follows:

1 US dollar = 118 Japanese Yen  
1 US dollar = 78 Kenyan Shillings.

Calculate the duty paid in Kenya Shillings.

(3 marks)

$$\frac{10}{100} \times 2900,000 = 290,000 \text{ J. yen} \quad M1$$

$$\frac{290,000}{118} \times 78 \quad M1$$

$$= \text{KSh } 191,694.92 \quad A1$$

3

7. Solve the equation;

(3 marks)

$$4^x + 2^{2x+1} = 36$$

$$(2)^{2x} + 2 \times 2^{2x} = 36$$

$$2^{2x} + 2^{2x} \times 2^1 = 36$$

$$2^{2x}(1+2) = \frac{36}{3}$$

$$2^{2x} = 12$$

$$\text{Log } 2^{2x} = \text{log } 12$$

$$2x \text{log } 2 = \text{log } 12$$

$$2x = \frac{\text{log } 12}{\text{log } 2}$$

$$2x = 3.585$$

$$x = 1.7925 \quad A1$$

3

8. Line AB is perpendicular to a line whose equation is  $y - 2x + 7 = 0$  and passes through point  $(-4, 5)$ . Determine the equation of AB in the form  $y = mx + c$ .

(3 marks)

$$y = 2x - 7$$

$$\text{Gradient of AB} = -\frac{1}{2} \quad B1$$

$$\frac{y-5}{x+4} = -\frac{1}{2} \quad M1$$

$$2(y-5) = -1(x+4)$$

$$2y - 10 = -x - 4$$

$$2y = -x + 6$$

$$y = -\frac{1}{2}x + 3 \quad A1$$

3

4

3

9. Simplify the following expression.

$$\frac{\cos^2 \theta - 1}{\sin \theta}$$

(3 marks)

(2 marks)

$$\frac{\sin^2 \theta}{\sin \theta}$$

$$= \sin \theta$$

\_\_\_\_\_

M1

A1

②

10. Without using a calculator evaluate using squares, square roots and reciprocal tables the following:-

(3 marks)

$$\frac{2}{30.16^2} + \frac{10}{\sqrt{588.3}}$$

$$\frac{2}{(3.016 \times 10)^2} + \frac{10}{\sqrt{5.883 \times 10^2}}$$

M1 Both sq. & Root

$$\frac{2}{9.097 \times 10^2} + \frac{10}{2.425 \times 10}$$

M1 for Recip ✓

$$(2 \times 0.001099) + (10 \times 0.0412)$$

$$0.002198 + 0.412$$

$$\underline{\underline{0.414198}}$$

A1

③

11. Two of the exterior angles of a polygon are  $63^\circ$  each. The remaining exterior angles are each  $26^\circ$ . Determine the number of sides of the polygon.

(3 marks)

Let the sides be  $n$

$$(63 \times 2) + 26(n-2) = 360$$

M1 or equiv.

$$126 + 26n - 52 = 360$$

$$26n + 74 = 360$$

$$26n = 286$$

← M1

$$\underline{\underline{n = 11}}$$

A1

④

12. A number when divided by 10, 15 and 18, the remainders are 7, 12 and 15 respectively. Find the lowest number. (3 marks)

2	10	15	18
3	5	15	9
3	5	5	3
3	5	5	1
5	1	1	1

$$2 \times 3^3 \times 5 = 270 \quad M1$$

$$270 - 3 = \underline{\underline{267}} \quad M1A1$$

3

13. The figure below shows part of a circle. Complete the circle and determine the radius and the centre of the circle. (3 marks)

Radius = 3 + 0.1 cm



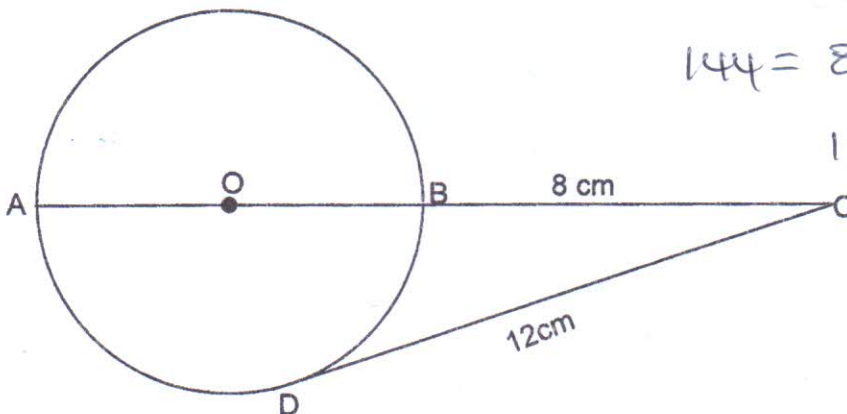
B1 ✓ const 2 chords and bisecting

B1 Complete Circle

B1 Radius

3

14. In the figure below, DC is a tangent to the circle centre O at D. AOB is a straight line meeting DC at C. DC = 12 and BC = 8. Find the radius of the circle. (3 marks)



$$12^2 = (AB+8)8 \quad M1$$

$$144 = 8AB + 64$$

$$144 - 64 = 8AB$$

$$AB = \frac{80}{8} \quad M1$$

$$AB = 10$$

$$\underline{\underline{\text{Radius} = 5 \text{ cm.}}} \quad A1$$

3

