

NAME..... SCHOOL..... ADM.NO.....

CLASS.....

Date.....

Sign.....

## SUKELLEMO JOINT MOCK 2020

### Kenya Certificate of Secondary Education MATHEMATICS PAPER 1

**Paper 1**  
2 ½ hours

**Instructions to Candidates**

1. Write your name, school, admission number and class in the spaces provided above.
2. Sign and write the date of examination in the spaces provided above.
3. This paper consists of **TWO sections; Section I and II**
4. Answer **ALL** the questions in **Section I** and **only five** questions from **Section II**.
5. Show all the steps in your calculation, giving your answer at each stage in the spaces provided below each question.
6. Marks may be given for correct working even if the answer is wrong.
7. **Non-programmable** silent electronic calculators **and** KNEC mathematical tables may be used except where stated otherwise.
8. **This paper consists of 13 printed pages.**
9. **Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**

For examiners use only

**Section I**

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

**Section II**

| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | TOTAL |
|----|----|----|----|----|----|----|----|-------|
|    |    |    |    |    |    |    |    |       |

**GRAND TOTAL**

|  |
|--|
|  |
|--|

**SECTION I ( 50 MARKS)**

1. A straight line passes through points  $(-3, 3)$  and  $(4, 2)$ . Determine, by calculation, the point at which the line cuts  $x - axis$ . (3marks)
  
2. The lengths of three wires were 36m, 48m and 60m. Pieces of equal length were cut from the three wires. Calculate the least number of pieces obtained from the wires (3marks)
  
3. Solve the inequality  $9 - 6x < 3x \leq 2x + 5$  and show the solution on a number line. (3marks)
  
4. Evaluate using square root, squares and reciprocal tables. (4marks)  
$$\frac{2}{\sqrt{0.7359}} + 0.3975^2$$

5. Without using a calculator, evaluate the value of  $y$  in (3marks)

$$\frac{(256)^{\frac{1}{y}}}{(\sqrt{32})^y \times 4^y} - 1 = 0$$

6. Use logarithm tables to evaluate:-  $\frac{6.373 \log 4.948}{(0.004636)^{0.5}}$  (4marks)

7. A two-digit number is such that the sum of the ones digit and the tens digit is 10. If the digits are reversed, the number exceeds the original number by 54. Find the number. (3Marks)

8. A cylinder of radius 14cm contains water. A metal solid cone of base radius 7cm and height 18cm is submerged into the water. Find the change in height of the water level in cylinder. (3Marks)

9. A Kenyan bank buys and sells foreign currencies at the exchange rates shown below.

|             | Buying<br>(KShs.) | Selling<br>(KShs.) |
|-------------|-------------------|--------------------|
| 1 Euro      | 147.86            | 148.00             |
| 1 US Dollar | 74.22             | 74.50              |

An American arrived in Kenya with 20 000 Euros. He converted all the Euros to Kenya shillings. He spent KShs. 2,512,000 while in Kenya and converted the remaining Kenya shillings into US Dollars. Find the amount in Dollars that he received. (3Marks)

10. The position vectors of A and B are given as  $a = 2i - 3j + 4k$  and  $b = -2i - j + 2k$  respectively. Find to 2 decimal places, the length of vector AB. (3Marks)

11. A regular polygon has internal angle of  $150^{\circ}$  and side of length 8cm.

(a) Find the number of sides of the polygon. (2Marks)

(b) Find the perimeter of the polygon. (2Marks)

12. A point C is on a line PQ where  $PQ = 9\text{cm}$ . C divides PQ such that  $PC = \frac{4}{7} PQ$ . By construction locate C. (3marks)

13. The cost of 7 shirts and 3 pairs of trousers is shs.2950 while that of 5 pairs of trousers and 3 shirts is less by shs.200. How much will Dan pay for 2 shirts and 2 pairs of trousers? (3marks)
14. One hundred and sixty examiners, each marking 100 scripts per day, are needed to mark an examination in 4 weeks. How many days would 250 examiners, each marking 60 scripts in a day, take to mark the same examination? (3marks)
15. The image of a point A(6, 8) under enlargement scale factor -2 is A<sup>1</sup>(-9, -10) find the coordinates of the centre of enlargement. (3marks)
16. Simplify  $\frac{3bx-3by+4ax-4ay}{4a+3b}$  (3marks)

**SECTION II ( 50 MARKS)**

17. A bullet is shot vertically upwards and its height,  $h$  metres, at time  $t$  seconds is given by

$$h = -3.2t^2 + 256t$$

(a) Find the velocity with which the bullet was shot.

(2marks)

(b) How fast is the bullet moving at  $t = 15$  seconds?

(2marks)

(c) How far up does the bullet travel?

(3marks)

(d) Find the time and the velocity with which the bullet strikes the ground.

(3marks)

18. The following distribution shows the marks obtained by 82 students in a Mathematics test.

| Marks     | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 |
|-----------|-------|-------|-------|-------|-------|-------|-------|
| Frequency | 3     | 18    | 13    | 14    | 17    | 12    | 5     |

a) Calculate to 2 decimal places:

i) the mean mark

(3Marks)

ii) the median mark.

(3Marks)

iii) the quartile deviation

(4Marks)

19. P, Q and R are three villages such that  $PQ = 12\text{km}$ ,  $QR = 10\text{km}$  and  $PR = 6\text{km}$  are connecting roads.
- a. Using a scale of 1cm to represent 1km, locate the relative positions of the three villages. (2Marks)

- b. A water tank T is to be located at a point equidistant from the three villages. By construction locate water tank T and measure its distance from R. (2Marks)

Determine the shortest distance from T to the road PQ by construction. (2Marks)

- d. Determine the area enclosed by the roads PQ, QR and PR by calculation. (3Marks)



20. Arc of a circle of radius 40cm subtends an angle of  $126^{\circ}$  at the centre of the circle. Using  $\pi = \frac{22}{7}$

(a) Calculate:

(i) The length of the arc. (2marks)

(ii) The area of the sector. (2marks)

(b) The sector is folded to form a cone.

Calculate:

(i) The radius of the base of the cone. (2marks)

(ii) The height of the cone. correct to 2 decimal places (2marks)

(iii) The capacity of the cone in litres correct to 2 decimal places. (2marks)

21. A straight line passes through the points (8, -2) and (4,-4).

(a) Write its equation in the form  $ax + by + c = 0$ , where a, b and c are integers.

(3marks)

(b) If the line in (a) above cuts the x-axis at point P, determine the coordinates of P.

(2marks)

(c) Another line, which is a perpendicular bisector to the line in (a) above cuts the y-axis at the point Q. Determine the coordinates of point Q.

(3marks)

(d) Find the length of QP

(2marks)

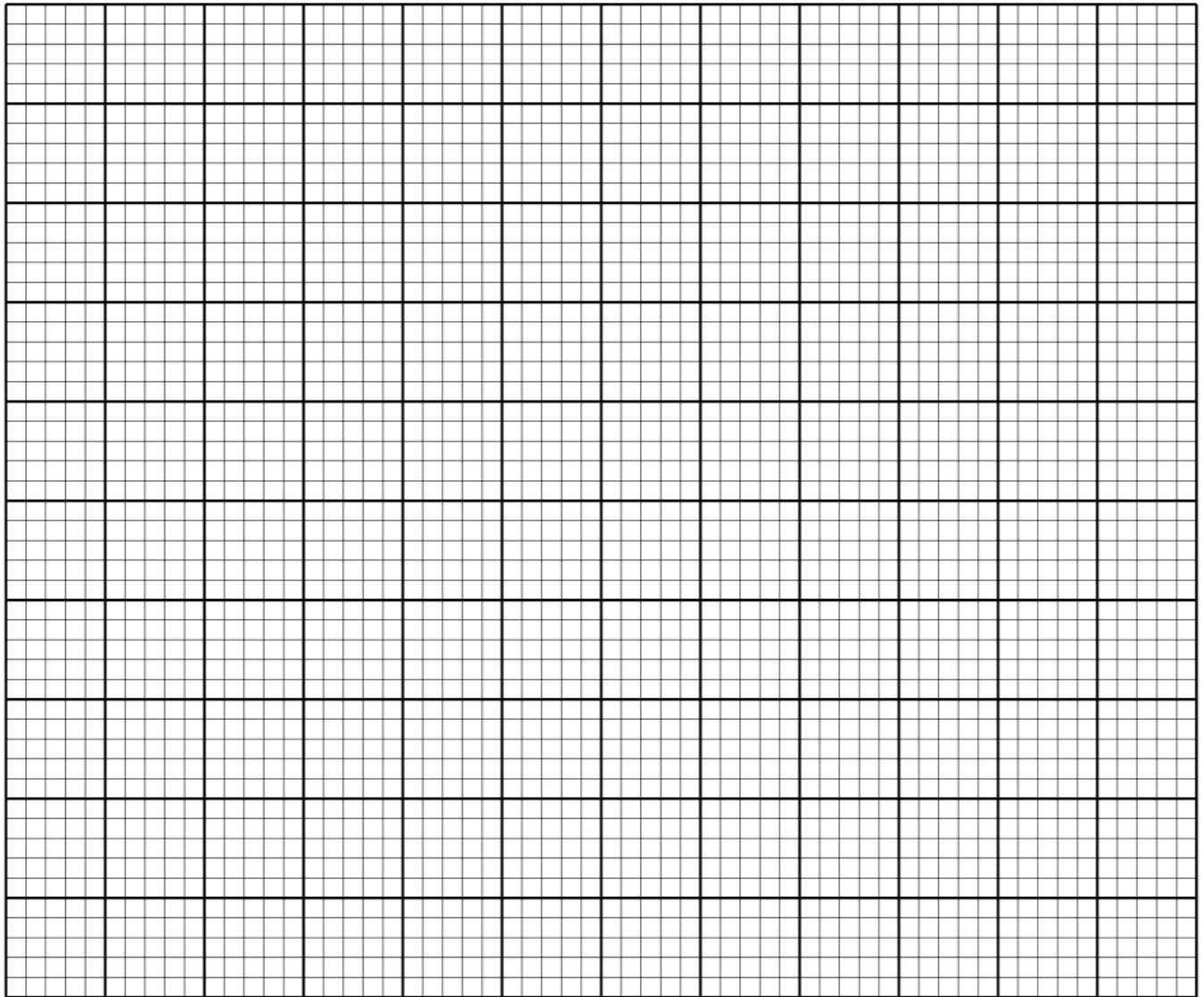
22. (a) Fill the table below for the function  $y = 2x^2 + 6x - 5$  for the domain  $-4$  to  $3$

(2 Marks)

|   |    |    |    |    |   |   |   |   |
|---|----|----|----|----|---|---|---|---|
| x | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| y |    |    |    |    |   |   |   |   |

b (i) Draw the graph of  $y = 2x^2 + 6x - 5$ , for  $-4 < x < 3$  on grid given

(3Marks)



ii) On the same axes, draw line  $y = 7x + 1$

(1Mark)

c) Determine the values of  $x$  at the points of intersection of the curve  $y = 2x^2 + 6x - 5$  and line  $y = 7x + 1$

(2Marks)

d) Use your graph to estimate the value of  $2x^2 + 6x = 5$

(2Marks)

23. There were 240 exercise books to be given to form four class. On a certain day, 34 students were absent for various reasons. If the books were to be shared equally among the students present on that day, the number obtained by each student was equal to the total number of students in the class.

a) Letting  $x$  to represent the total number of students in the class, write an expression of the number of books each of the present student got. (2marks)

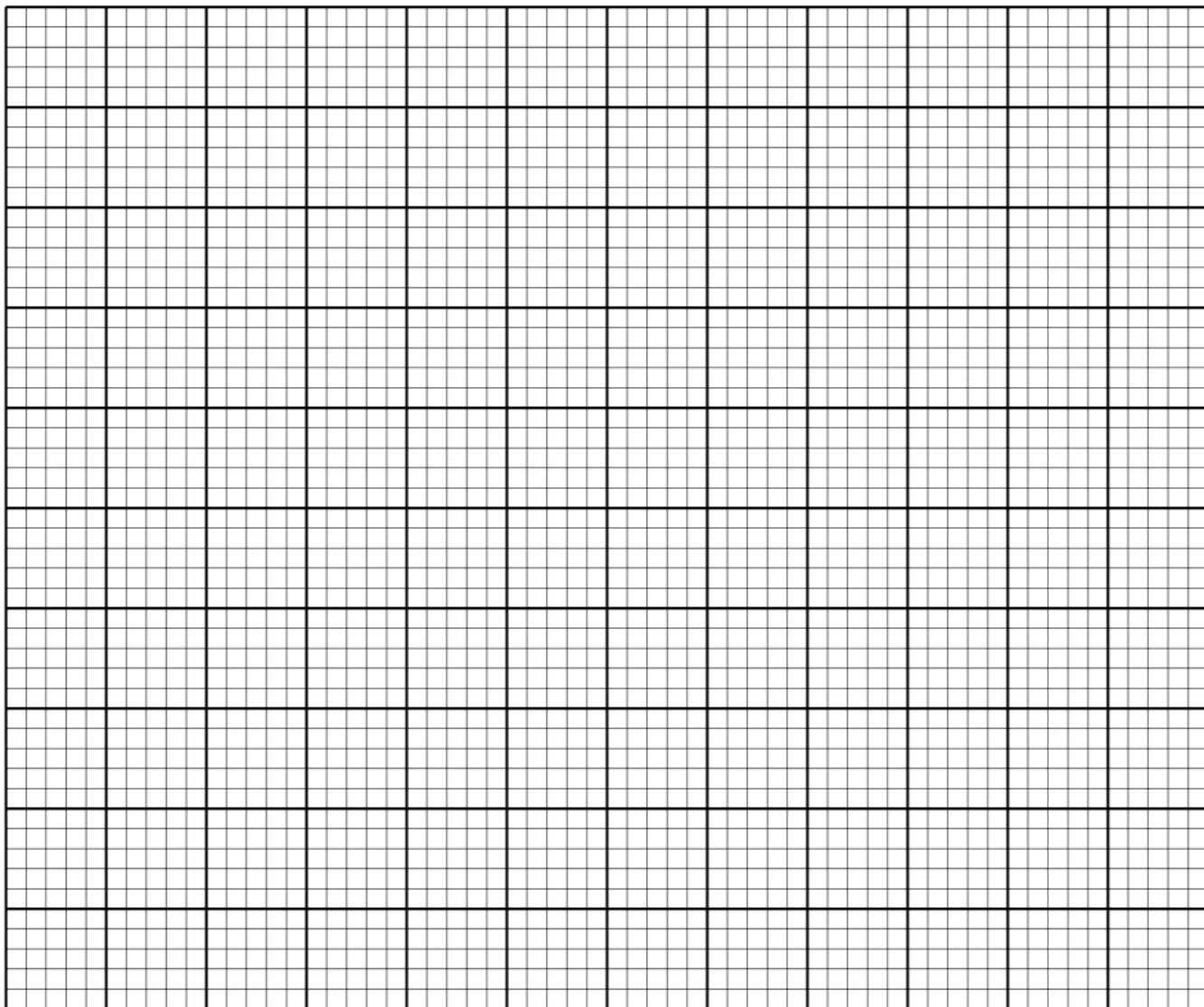
b) Form an equation in  $x$  that gives the number of books obtained by each student. (3marks)

c) Solve the equation above hence give the total number of students in the class. (5marks)

24. Given that figure ABCD with A(3,7), B(5,5), C(3,1) and D(1,5).

a) On the grid provided plot ABCD

(1mark)



b)  $A'B'C'D'$  is the image of ABCD under translation  $T \begin{pmatrix} -6 \\ -9 \end{pmatrix}$ . Plot  $A'B'C'D'$  and state its co-ordinates. (3marks)

c)  $A''B''C''D''$  is the image of  $A'B'C'D'$  after a rotation about  $(-1, 0)$  through a positive quarter turn. Plot it and state its co-ordinates. (3marks)

d)  $A'''B'''C'''D'''$  is the image of  $A''B''C''D''$  after a reflection in the line  $Y=x+2$ . Plot it and state its co-ordinate. (3marks)