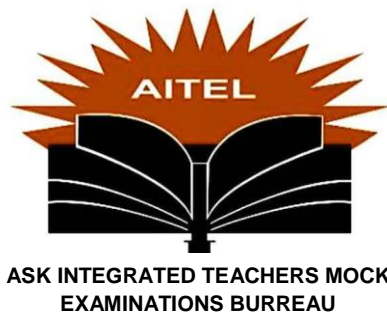


Student's name:

SCHOOL: RANDOM:

456/1
MATHEMATICS 1
Paper 1
July/Aug. 2024
2 hours 30 Minu



AITEL JOINT MOCK EXAMINATIONS 2024.

Uganda Certificate of Education

MATHEMATICS

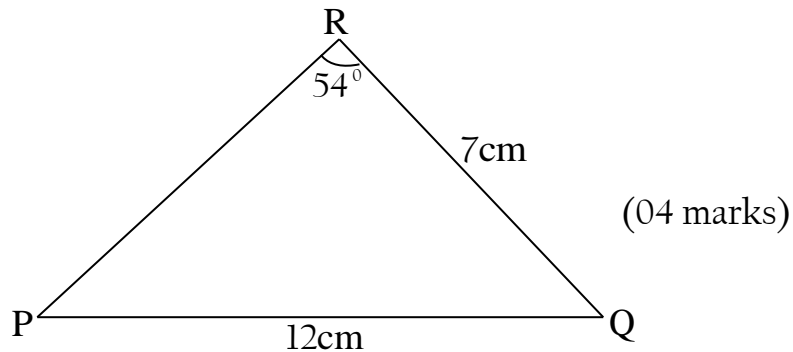
PAPER 1

Instructions:

- (i) Attempt all questions in section A and NOT more than five questions from section B
- (ii) All section B questions carry equal marks
- (iii) All the necessary calculations must be done on the same sheet of paper as the rest of the answer. Therefore, no paper shall be given for rough work
- (iv) Graph paper shall be provided.
- (v) Silent, non-programmable calculators may be used

Section A: (40 Marks)

1. Simplify the expression $\frac{a^2 - 2ab + b^2}{a^2 - b^2}$ (04 Marks)
2. Arrange the equation of the line $\left\{ (x, y) : \frac{1}{2}y + 3x - 6 = 0 \right\}$ in the form $y = mx + c$ and hence find its gradient and y-intercept. (04 marks)
3. A circle has a radius of 13 cm. How far from the centre is a chord 10 cm long? (04 marks)
4. Factorize the expression $5x^2 - 26x + 5$. Hence find the values of x when $5x^2 - 26x + 5 = 0$. (04 marks)
5. In the triangle PQR below $p = 7$ cm, $q = 12$ cm angle $Q = 54^\circ$. Find angle P.



6. 75 tickets were sold for a fundraising dinner. Tickets were on sale at two prices, shs. 7500 each and shs. 10,000 each. The total raised by the ticket sales was shs. 750,000. How many tickets were sold at each of the two prices? (04 marks)
7. Reflect the point $T(4,8)$ successively in the mirror lines given by the equations $x + y = 0$, $x = 0$ and $y = 1$ and give the coordinates of the final image. (04 marks)
8. Solve the equation using matrix method;
$$\begin{matrix} 4x - y + 5 = 0 \\ 5y + 4x = 3 \end{matrix}$$
 (04 marks)

9. Study the table below and use it to find:

Marks	30	32	34	36	38	40
Frequency	5	6	9	k	3	5

- (i) The value of k, if mean mark is 42.
(ii) The modal mark. (04 marks)

10. Box P contains 5 red and 3 green beads and Box Q contains 4 red and 4 green beads. Bobi selects a box and then a bead at random from the box. Bobi is twice as likely to choose Box Q as Box P. what is the probability that Bobi selects a red bead? (04 Marks)

Section B: (60 Marks)

11. The data below shows the weights in kilograms of 30 students sampled in a secondary school;

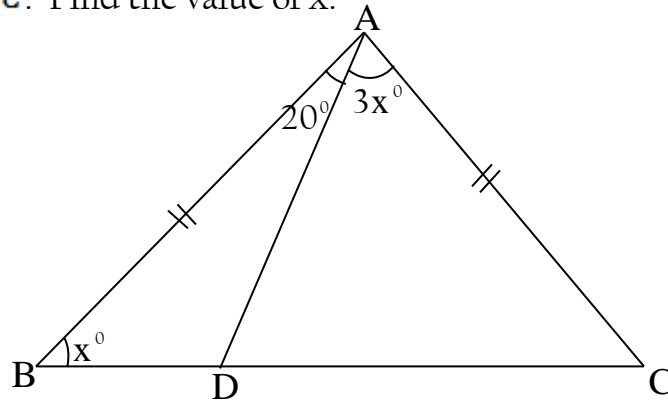
Weight (kg)	Number of students
35 – 39	2
40 – 44	4
45 – 49	7
50 – 54	3
55 – 59	5
60 – 64	6
65 – 69	3

(a) State the model class

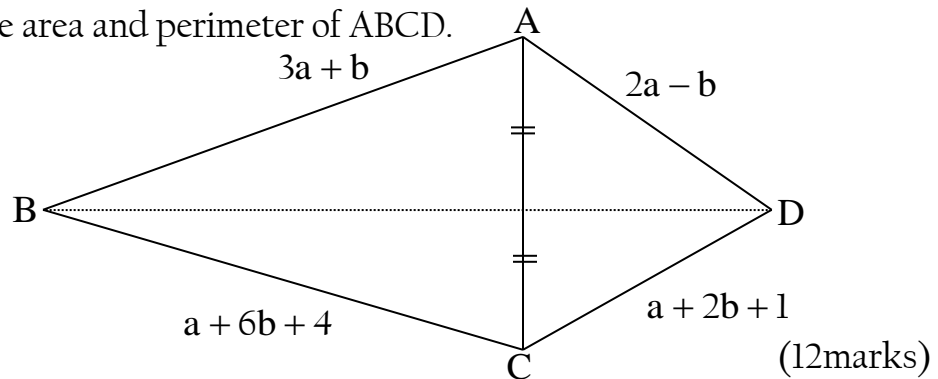
Calculate the mean weight of the students, using 50kg as the assumed mean

(b) Find the probability that a student selected at random weighs 50 kg and above. (12 marks)

12. (a) In the triangle ABC, angle ABC = x° , angle DAC = $3x^\circ$, angle DAB = 20° and $\overline{AB} = \overline{AC}$. Find the value of x.



The figure below shows a kite ABCD. Find the values of a and b. Hence determine the area and perimeter of ABCD.



13. A ship leaves Nakiwogo and sails for 240 km on a bearing of 060° . It then changes direction to a bearing of 135° and sails for 320 km to an island.

Using a scale drawing with 1 cm representing 40 km, find;

(a) The distance of Nakiwogo from the island

(b) The bearing of Nakiwogo from the island

(c) How long it would take the ship to move directly back to Nakiwogo at a speed of 40km/h. (12 marks)

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

(a) Construct a triangle PQR with $\overline{PQ} = 8$ cm and $\overline{PR} = 12$ cm and angle PQR = 120° .

(b) Draw a perpendicular from R onto \overline{PQ} produced meeting \overline{PQ} at S.

(c) Draw a circle with centre T and radius ST where T is a point equidistant from S, P, and R. Hence calculate the circumference of the circle.

(12arks)

15. (a) Draw the graph of $y = x^2$ for $-3 \leq x \leq 3$. Use the graph to solve

$$x^2 + 2x - 3 = 0.$$

(b) Solve a pair of simultaneous equations using a graphical method;

$$y - x = 5 \text{ and } 2y - 5x = 16. \quad (12 \text{ marks})$$

16. Triangle PQR with vertices $P(-5,2)$, $Q(-2,2)$ and $R(-3,4)$ is mapped onto

$$P'Q'R' \text{ under the transformation } T = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}.$$

(a) Plot and label triangle PQR and its image $P'Q'R'$.

(b) Describe the transformation T.

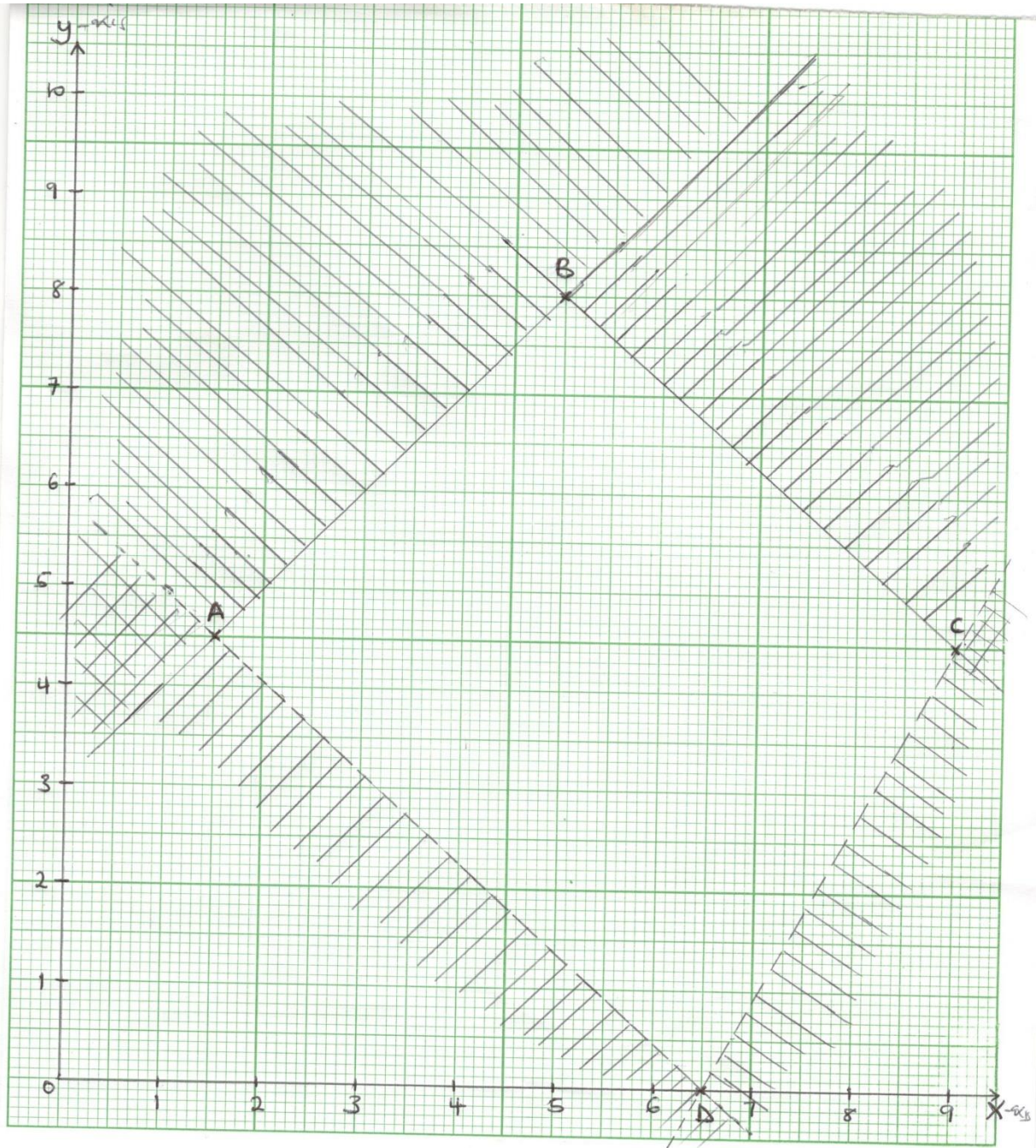
(c) $P''Q''R''$ is the image of $P'Q'R'$ under the transformation $S = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$. Find

the coordinates of $P''Q''R''$. On the same axes plot and label $P''Q''R''$ and

Describe the transformation S.

(d) Find the single matrix which maps PQR onto $P''Q''R''$. (12 marks)

17. In the figure below A, B, C, and D are vertices of the feasible region.



- Find all the inequalities, which satisfy the feasible region.
- Use that graph to find the maximum and minimum value of $Z = 5x + 8y$
- Find the area enclosed by the feasible region

(12 marks)

End