

KALA FORM 4 TRIAL EXAMINATION
Kenya Certificate of Secondary Education

121/1 — MATHEMATICS — Paper 1
ALT A
Jul. 2026 – 2½ hours



Name: Admission No:

Candidate's Signature: School: Class: Date:

Instructions to candidates

- (a) Write your name and index number in the spaces provided above.
- (b) Sign and write the date of examination in the spaces provided above.
- (c) This paper consists of **two** sections: **Section I** and **Section II**.
- (d) Answer **all** the questions in **Section I** and only **five** questions from **Section II**.
- (e) **Show all the steps in your calculations, giving your answers at each stage in the spaces provided below each question.**
- (f) Marks may be given for correct working even if the answer is wrong.
- (g) **Non-programmable** silent electronic calculators and KNEC Mathematical tables may be used, except where stated otherwise.
- (h) **This paper consists of printed 18 pages.**
- (i) **Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**
- (j) **Candidates should answer the questions in English.**

For Examiner's 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

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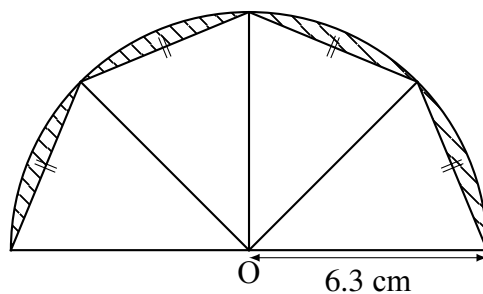
SECTION I(50 marks)

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

- 1 Without using a calculator evaluate, $\frac{-3(4+2) - (-12) \div 4 + 7}{-4 \times (-3) + (-5) \times 2}$. (3 marks)

- 2 Due to low enrolment a school reduced the quantity of maize flour used in the ratio 5 : 7 per mill. If initially used 280 kg of maize flour per mill. Find the number of students in the school if each fed on 125 g of maize flour. (3 marks)

- 3 The figure below shows a semicircle of radius 6.3 cm.



- Calculate the area of the shaded region correct to 2 decimal places. (3 marks)

- 4 Without using a calculator or mathematical tables, evaluate:

$$\sqrt{\frac{64^{-4} \times 128^2 \times 96^3}{24}}.$$

(3 marks)

- 5 Four metal rods have lengths of 216cm, 324cm and 270cm. The rods are cut into shorter pieces of the same length such that there is no metal left. Calculate the maximum number of the pieces obtained.

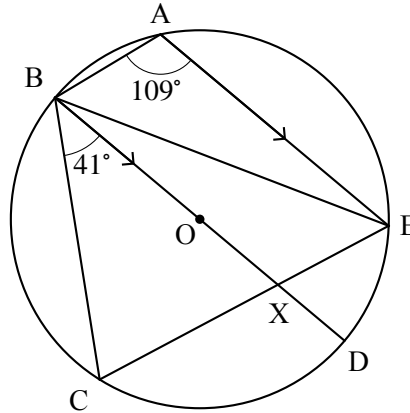
(3 marks)

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- 6 Simplify and hence factorise the expression $(4x - 3y)(3x + 4y) - 7xy$.

(3 marks)

- 7 The diagram below shows a circle $ABCDE$. BD is a diameter of the circle centre O . AE is parallel to BD . BD intersects CE at X . Angle $CBD = 41^\circ$ and angle $BAE = 109^\circ$.



Determine the size of:

- (a) angle ABE . (2 marks)

- (b) angle BXE . (1 mark)

- 8 A clock which gains 15 seconds every hour was set to read in 24 hour clock system the correct time on 1st July 2026 at 0800 hours. Determine the date and time the clock will next read the correct time. (3 marks)

- 9 Find the equation of a straight line which is equidistant from the points $(-4, 2)$ and $(-2, -1)$, expressing it in form $ax + by = c$, where a , b and c are constants. (3 marks)

- 10 Given that $\sin(4x - 15^\circ) = \cos(x + 5^\circ)$, find $\tan(4x - 15^\circ)$ giving your answer to 4 significant figures. (3 marks)

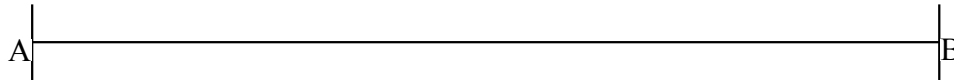
- 11 A community-based organization in Kenya received a donation of 150 000 Euros. The money was converted into Kenyan Shillings in a bank which sells foreign currency as follows.

Currency	Buying (Ksh)	Selling (Ksh)
1 Euro	171.80	172.70
100 South African Rand	835.00	840.30

- (a) Calculate the amount of money, in Kenyan Shillings, that the organization received. (1 mark)
- (b) The organization used 80 % of the donation to purchase equipment from South Africa. Calculate the cost of the equipment to the nearest South African Rand. (3 marks)

- 12 Given that $\mathbf{u} = \begin{pmatrix} k \\ 1 \end{pmatrix}$ and $\mathbf{v} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$, find the two possible values of k such that the magnitude of the vector $\mathbf{w} = \mathbf{u} + 2\mathbf{v}$ is exactly $\sqrt{26}$. (3 marks)

- 13** Using the line segment AB below, construct a line AC on the upper side such that $\angle BAC = 30^\circ$ and use it to locate a point P on AB such that $AB : BP = 5 : -1$. (3 marks)

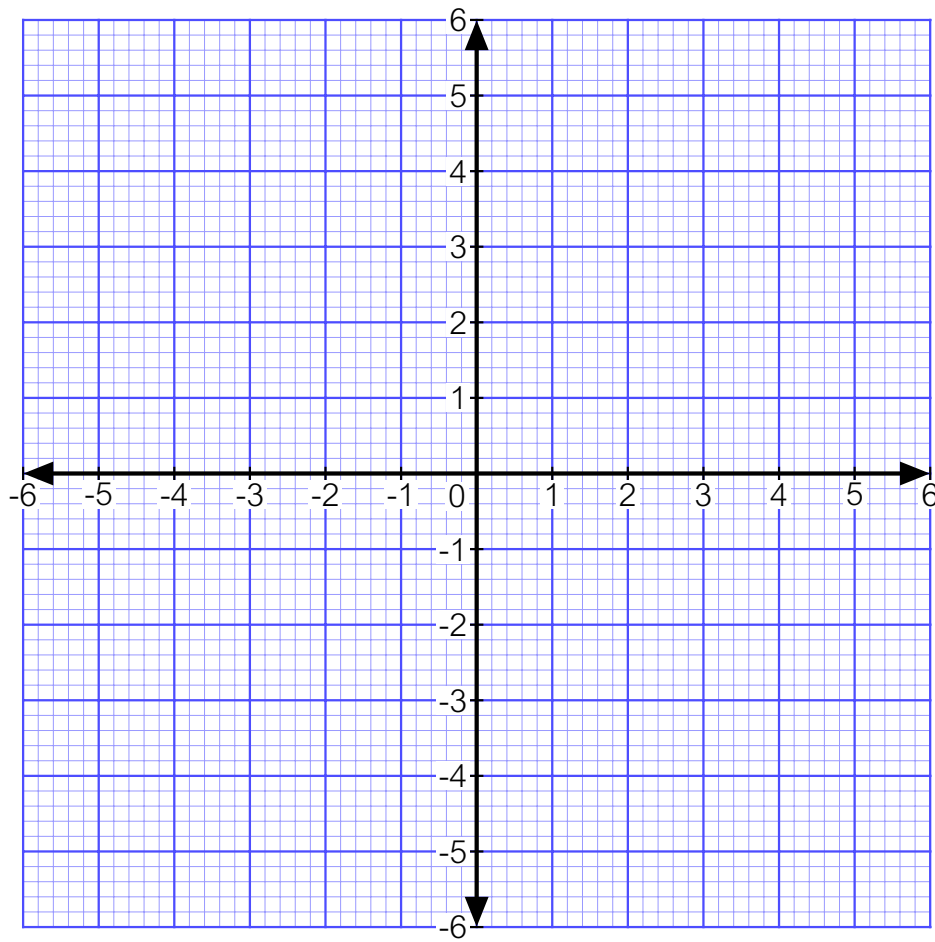


- 14** The environmental club of a school received 150 m of fencing wire from a well wisher to fence off three sides of a rectangular area. They planned to plant trees while using the school wall as the fourth side. Find the maximum possible area the club may fence off. (4 marks)

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- 15** During the women's Olympic marathon, Chepkemai maintained an average speed of 5.8 m/s. When she was 348 m from the finishing line, Chebet was 42 m behind her. However, when Chepkemai crossed the finishing line, Chebet was still 18 m away from the finishing line. Determine Chebet's average speed. (3 marks)

- 16 On the grid provided, represent the linear inequalities $2y + x > 0$, $x \leq 3$ and $3x - 5y > -15$.
(3 marks)



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SECTION II(50 marks)

*Answer only **five** questions from this section in the spaces provided.*

- 17** A Technical and Vocational Education and Training (TVET) planned to equip computer lab by buying some computers from a total of Ksh 2 625 000. Due to inflation, before they could buy the computers the price per unit was increased by Ksh 2 500. This increase in price enabled the institution to buy five less computers using the same amount of money on originally planned. Taking x to be the original number of computers.

(a) Write an expression in terms of x representing:

(i) original price per computer; (1 mark)

(ii) new price per computer. (1 mark)

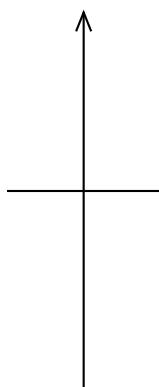
(b) Form an equation using the expressions in (a) above and hence determine the number of computer the school bought. (5 marks)

(c) Calculate the percentage increase in the price per unit of the computers bought correct to 4 significant figures. (3 marks)

- 18** Every month, a forest ranger drives a distance of 70 km on a bearing of 068° from the Forest Headquarters to pick up another ranger at Station A before proceeding for a joint patrol. The forest observation post is 85 km from Station A on a bearing of $S35^\circ E$. After completing the patrol, they travel a distance of 95 km on a bearing of 255° to inspect a water point used by wildlife before the forest ranger drives back to Station A to drop off the other ranger and then returns to the Forest Headquarters.

(a) Using a scale of 1:1 000 000, represent the above information on a scale drawing.

(4 marks)



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(b) Using the scale drawing, determine the:

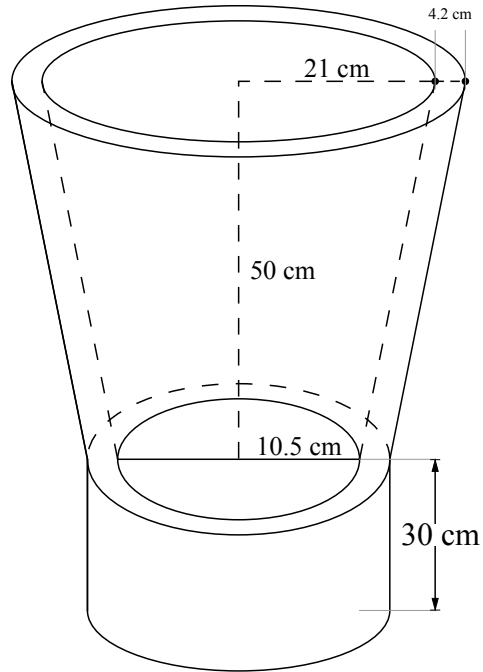
(i) bearing of the Forest Headquarters from the water point. (1 mark)

(ii) bearing of the Station A from the water point. (1 mark)

(iii) distance between Station A and the water point. (2 marks)

(iv) the total distance travelled by the forest ranger during the patrol. (2 marks)

- 19 The figure below represents a flower pot made of concrete in the shape of a hollow frustum whose vertical height is 50 cm. Given that the top and the bottom radii are 21 cm and 10.5 cm respectively and with a uniform thickness of 4.2 cm. The flower pot is also mounted on a solid cylindrical base whose height is 30 cm.



- (a) Calculate:
- the volume of the frustum part of the flower pot in cubic centimetres. (4 marks)
 - the volume of the solid base in cubic centimetres. (2 marks)

- (b) The flower pot is to be painted on the external part only leaving out the hollow frustum and the part of the cylindrical base resting on the floor. Find the total surface area that is to be painted to the nearest cubic centimetres. (4 marks)

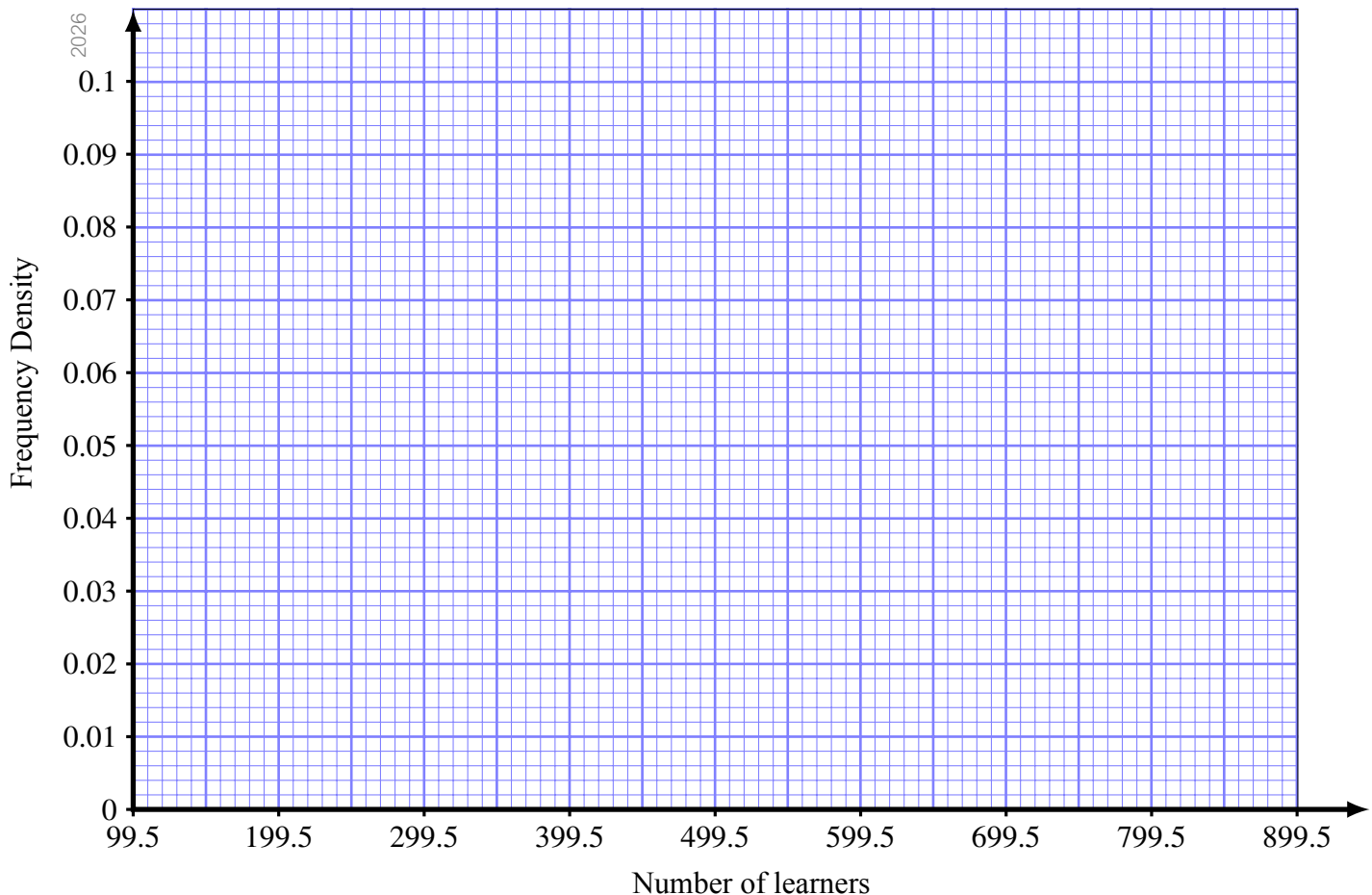
- 20 A county education office conducted a survey on learners enrolment in 40 public junior secondary schools. The number of learners enrolled in each school was recorded as follows:

118	145	167	182	195	203	219	237
248	255	267	279	285	298	312	326
338	349	355	367	378	389	402	418
425	439	447	458	469	482	495	512
526	548	563	589	612	645	720	835

- (a) Complete the frequency distribution table below for the data. (2 marks)

Number of learners	100–199	200–299	300–399	400–499	500–699	700–849
Number of schools						

- (b) On the grid provided, draw a histogram to represent the data. (4 marks)



(c) Use the histogram to estimate:

(i) the median number of learners per school. (2 marks)

(ii) the number of schools with more than 600 learners. (2 marks)

- 21 (a) A wholesale shop uses matrices to monitor stock movement. The matrices $\mathbf{A} = \begin{pmatrix} x & 2 \\ 4 & 1 \end{pmatrix}$ and $\mathbf{B} = \begin{pmatrix} 3 & 5 \\ 2 & 4 \end{pmatrix}$ are used in a computer model. Determine the value of x for which $\mathbf{AB}$ is singular. (3 marks)

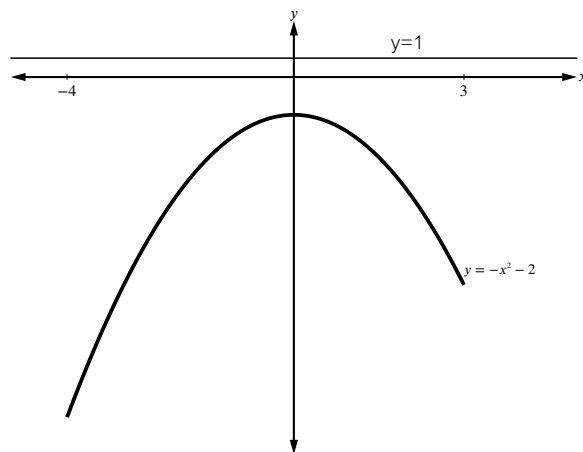
- (b) During the back-to-school season, a stationery shop sold exercise books and pens. On one day, a customer bought 5 exercise books and 4 pens for Ksh 420. Another customer bought 3 exercise books and 6 pens for Ksh 270. Let x represent the price of one exercise book and y represent the price of one pen.

(i) Form two equations representing the above information. (1 mark)

(ii) Use the matrix method to determine the price of an exercise book and that of a pen. (3 marks)

- (c) The students welfare bought 10 cartons each of 5 dozens of exercise books and 6 boxes each containing 20 pens for motivation awards. Determine the total amount of money the welfare spent. (2 marks)

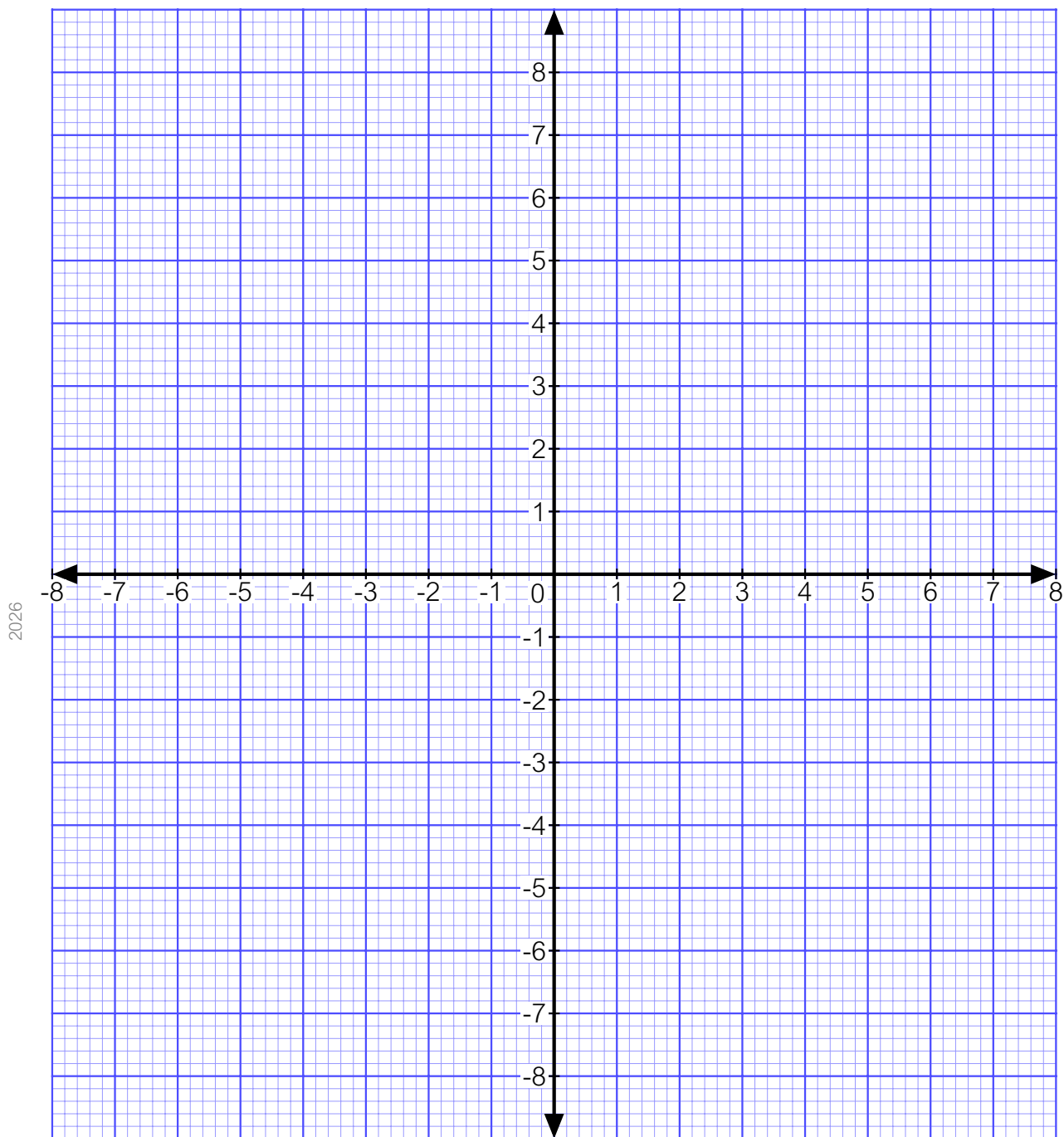
- 22 The diagram below is a sketch of the curve $y = -x^2 - 2$ and the line $y = 1$.



- (a) Using the trapezium rule with 7 strips, estimate the area bounded by the curve, the lines $x = -4$, $x = 3$ and $y = 1$. (5 marks)

- (b) Using the mid-ordinate rule with 7 strips estimate the area bounded by the curve, the lines $x = -4$, $x = 3$ and $y = 1$. (5 marks)

- 23 (a) Draw triangle ABC with vertices $A(-1, 4)$, $B(-3, 3)$, $C(-2, 1)$ and its image $A'B'C'$ with vertices $A'(2, -8)$, $B'(6, -6)$, $C'(4, -2)$ on the grid provided below. (2 marks)



- (b) Describe fully the transformation that mapped triangle ABC onto triangle $A'B'C'$. (2 marks)

- (c) On the same grid draw, $A''B''C''$ the image of $A'B'C'$ after a reflection in the line $y = 0$. (2 marks)
- (d) $A'''(-8, -2)$ is the image of A'' after a reflection along line **M**. Draw triangle $A'''B'''C'''$ and hence state the equation of line **M**. (3 marks)
- (e) State the type of congruency between $A''B''C''$ and $A'''B'''C'''$. (1 mark)

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- 24 A particle moves such that its displacement, s metres, from a given point is given by $s = \frac{2}{3}t^3 + \frac{3}{2}t^2 - 9t + 5$ where t is time in seconds.
Find the:

(a) displacement of the particle at $t = 3$. (2 marks)

(b) value of t when the particle is momentarily at rest. (3 marks)

(c) displacement during the fourth second. (3 marks)

(d) particles initial acceleration. (2 marks)

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