



Cambridge O Level

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MATHEMATICS (SYLLABUS D)
4024/11

Paper 1

October/November 2024
2 hours

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- Calculators must **not** be used in this paper.
- You may use tracing paper.
- You must show all necessary working clearly.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [].

 This document has **20** pages. Any blank pages are indicated.



ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER

- 1 At midday the temperature is -2°C .
At 6 pm the temperature is 4°C .

(a) Find the difference between these temperatures.

..... $^{\circ}\text{C}$ [1]

(b) The temperature at midnight is 9°C lower than the temperature at midday.

Find the temperature at midnight.

..... $^{\circ}\text{C}$ [1]

- 2 Amber and Pablo share \$280 in the ratio 2 : 5.

Work out Pablo's share.

\$ [2]

- 3 Here are eight integers.

−1 −5 −1 −3 −3 2 −1 −7

Find

(a) the mode

..... [1]

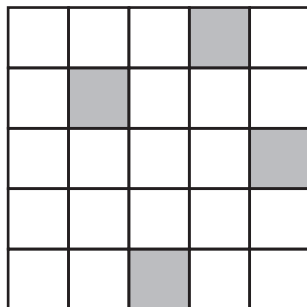
(b) the median.

..... [2]



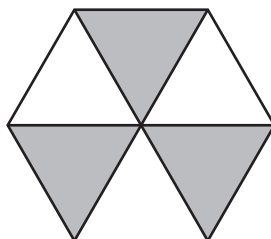


- 4 (a) Shade **one** more small square so the diagram has one line of symmetry.



[1]

- (b) Here is a regular polygon.



Complete the description of the rotational symmetry of this polygon.

The polygon has rotational symmetry of order

[1]

- 5 (a) Simplify.

$$2a - 3b + 4b - 5a$$

..... [2]

- (b) Expand.

$$5(3x - 2)$$

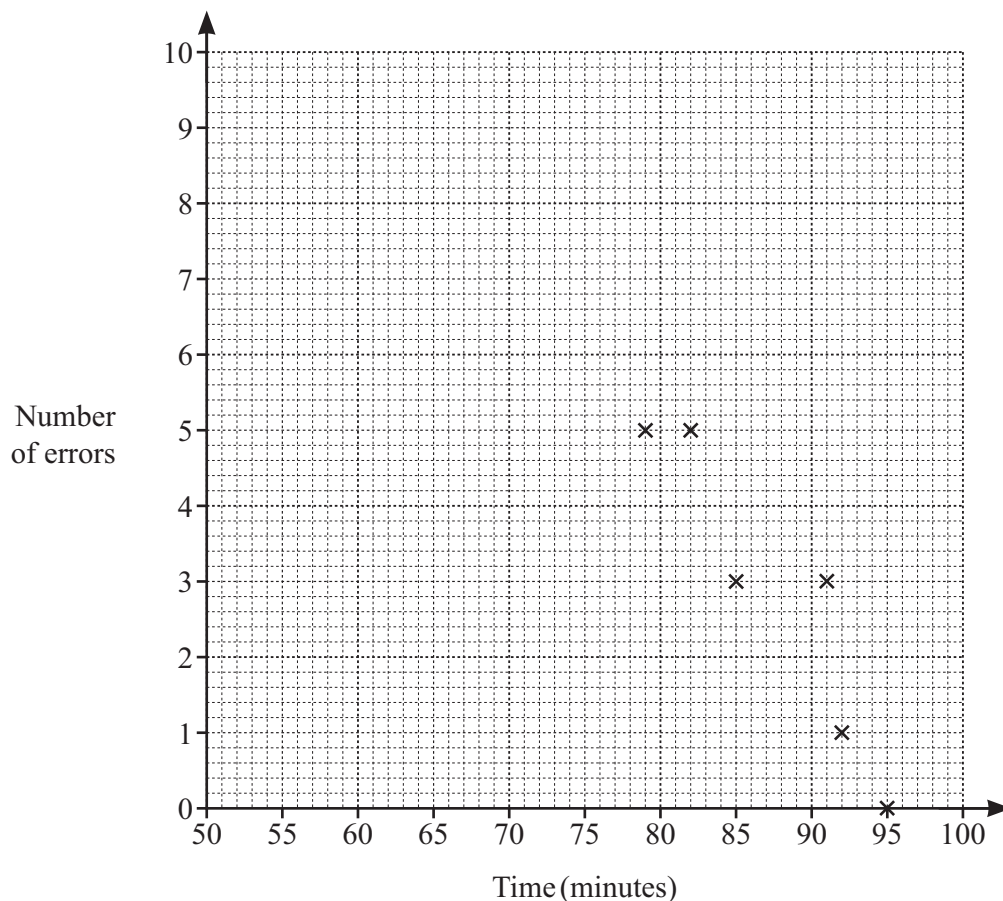
..... [1]





- 6 The table shows the time spent on a homework task and the number of errors made for some students in a class.

Time (minutes)	79	92	91	85	82	95	60	65	63	70
Number of errors	5	1	3	3	5	0	9	7	8	7



- (a) Complete the scatter diagram.
The first 6 points have been plotted for you. [2]
- (b) On the scatter diagram, draw a line of best fit. [1]
- (c) Another of the students in the class made 6 errors.

Use your line of best fit to estimate the time this student spent on the homework task.

..... minutes [1]





7 By writing each number correct to 1 significant figure, calculate an estimate for the value of

$$\frac{3.1 \times 26.7}{6.9 - 2.3}.$$

..... [2]

8 These are the first four terms of a sequence.

2 8 14 20

(a) Find the next number in the sequence.

..... [1]

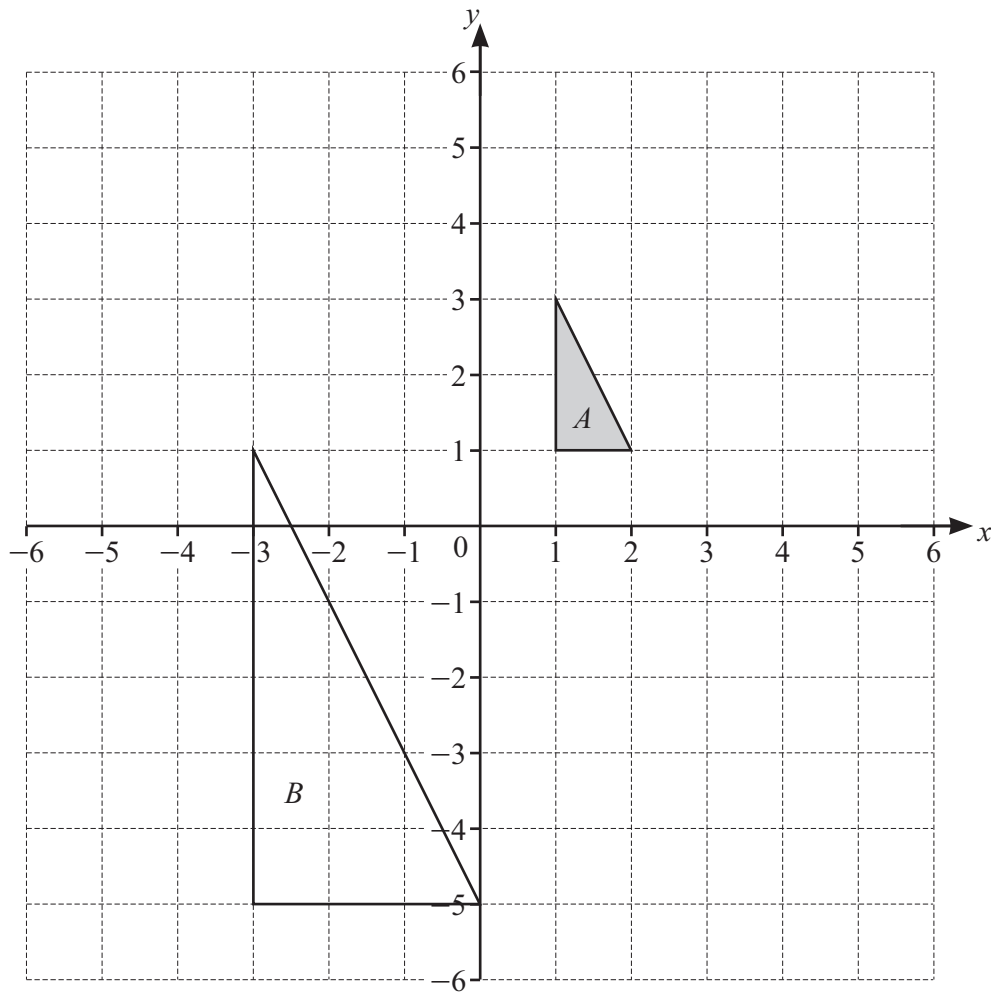
(b) Find an expression, in terms of n , for the n th term of this sequence.

..... [2]





- 9 The grid shows triangle A and triangle B .



- (a) Describe fully the **single** transformation that maps triangle A onto triangle B .

.....
 [3]

- (b) Triangle A is mapped onto triangle C by the translation $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$.

Draw triangle C .

[2]





- 10 Solve the simultaneous equations.
Show your working.

$$3a + b = -4$$

$$2a + 3b = 9$$

$$a = \dots\dots\dots$$

$$b = \dots\dots\dots [3]$$

- 11 Point $A(2, 4)$ is joined to point $B(5, -2)$ by a straight line.

- (a) Find the coordinates of the midpoint of AB .

$$(\dots\dots\dots, \dots\dots\dots) [1]$$

- (b) Find the gradient of the line AB .

$$\dots\dots\dots [2]$$





12 (a) Write 0.000 257 in standard form.

..... [1]

(b) Work out $\frac{2 \times 10^4}{4 \times 10^{-5}}$.

Give your answer in standard form.

..... [2]

13 Work out $2\frac{1}{5} \div \frac{3}{4}$.

Give your answer as a mixed number in its simplest form.

..... [2]

14 (a) Write 360 as a product of its prime factors.

..... [2]

(b) Find the smallest positive integer n such that $360n$ is a cube number.

$n =$ [1]





15 A sector of a circle with angle 60° has arc length 4π cm.

Find the area of the sector.

Give your answer, as simply as possible, in terms of π .

..... cm^2 [4]





16 (a) Express as a single matrix.

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

(b) $\mathbf{A} = \begin{pmatrix} 4 & k \\ 2 & 1 \end{pmatrix}.$

The determinant of $\mathbf{A}$ is 10.

(i) Find the value of k .

$$\begin{pmatrix} & \\ & \end{pmatrix} \quad [2]$$

$$k = \dots\dots\dots [1]$$

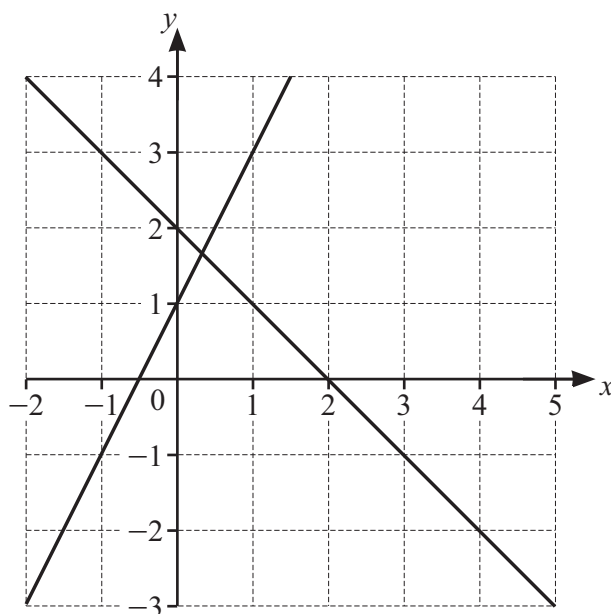
(ii) Find $\mathbf{A}^{-1}$.

$$\mathbf{A}^{-1} = \begin{pmatrix} & \\ & \end{pmatrix} \quad [1]$$





17 The diagram shows the lines $y = 2x + 1$ and $x + y = 2$.



(a) The region R is defined by these three inequalities.

$$y \leq 2x + 1 \quad x + y \leq 2 \quad y \geq -2$$

On the diagram, shade and label the region R .

[2]

(b) The point $(k, k - 2)$ lies in the region R where k is an integer.

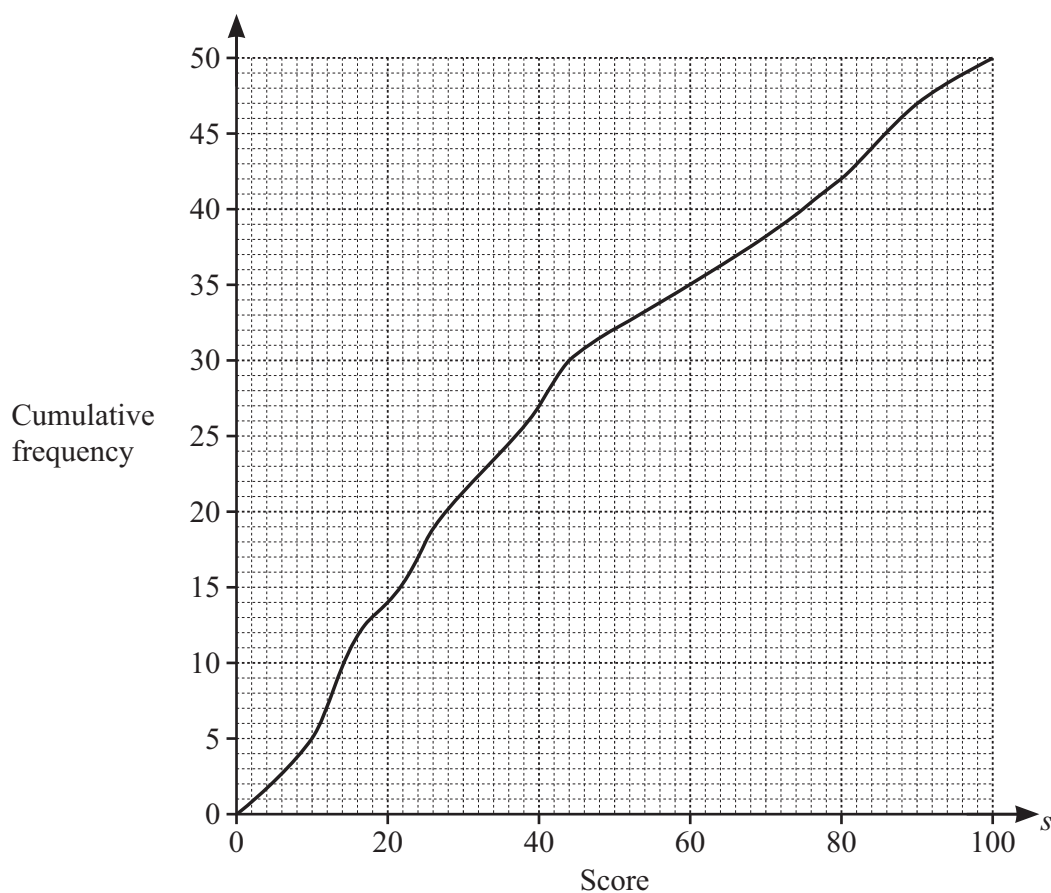
List the possible values of k .

..... [2]





- 18 50 adults each take part in a quiz.
The cumulative frequency diagram shows their scores.



- (a) Use the diagram to find an estimate of the interquartile range.

..... [2]

- (b) 20% of the adults win a prize for getting a high score in the quiz.

Use the diagram to work out the minimum score needed to win a prize.

..... [2]

- (c) Use the diagram to complete the frequency table.

Score (s)	$0 < s \leq 20$	$20 < s \leq 40$	$40 < s \leq 60$	$60 < s \leq 80$	$80 < s \leq 100$
Frequency					8

[2]





- 19 x is inversely proportional to the square root of y .
When $x = 2$, $y = 16$.

Find y when $x = 32$.

$$y = \dots\dots\dots [2]$$

20 $(ax^n)^{\frac{2}{3}} = 4x^{10}$

Work out the value of a and the value of n .

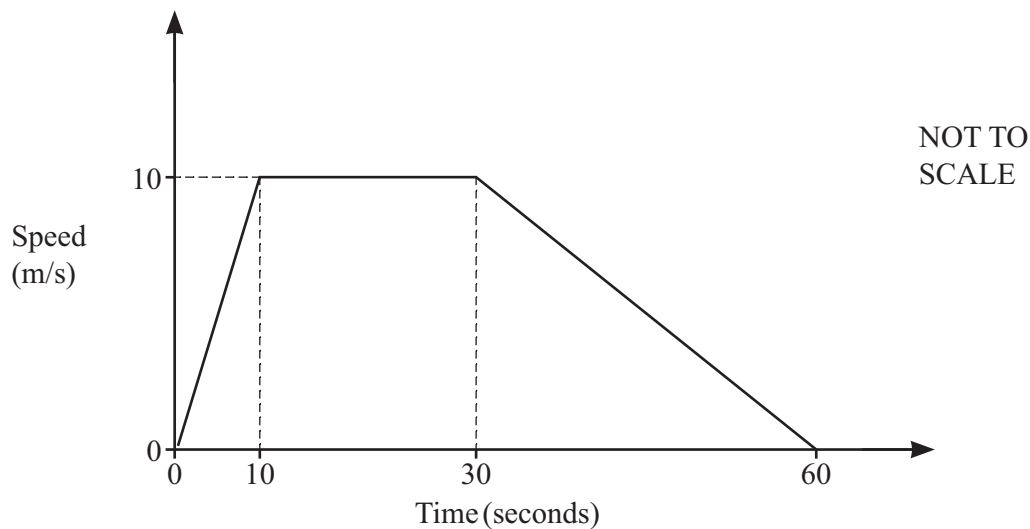
$$a = \dots\dots\dots$$

$$n = \dots\dots\dots [2]$$





21 The diagram shows the speed–time graph for a journey.



Calculate the total distance travelled.

..... m [2]





22 $f(x) = 3x^2 + 5$

(a) Work out $f(-1)$.

..... [1]

(b) Solve $f(2x) = 17$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

23 A rectangle has length 32 cm and width 15 cm.
Each measurement is given correct to the nearest centimetre.

(a) Write down the upper bound for the length.

..... cm [1]

(b) Calculate the upper bound for the difference between the length and the width.

..... cm [1]





24 Simplify.

$$\frac{2x^2 + 5x - 3}{2x^2 + 6x}$$

..... [3]

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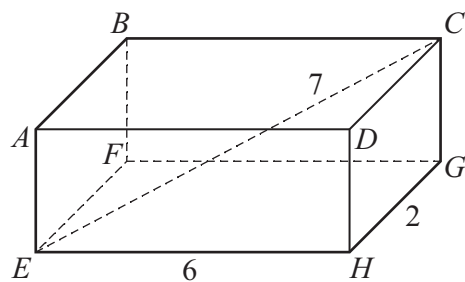
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25



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The diagram shows a cuboid.
 $EH = 6$ cm, $HG = 2$ cm and $EC = 7$ cm.

Calculate CG .

$CG = \dots\dots\dots$ cm [3]





26 Solve.

$$\frac{x}{x-1} - \frac{3}{2x-1} = 1$$

$x =$ [4]

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