

EXAMINATIONS COUNCIL OF LESOTHO
Lesotho General Certificate of Secondary Education

CANDIDATE
NAME

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CENTRE
NUMBER

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CANDIDATE
NUMBER

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MATHEMATICS
Paper 4(Extended)

0178/04
May/June 2026
2 hours 30 minutes
Marks: 130

Additional Materials: Electronic Calculator
Geometrical Instruments
Tracing Paper (optional)

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, centre number and candidate number in the relevant spaces provided at the top of this page.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

Answer **all** questions.

Electronic calculators should be used.

If working is needed for any question, it must be shown below that question.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142.

The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **17** printed pages and **3** blank pages.

- 1 (a) Teboho and Sebolelo share M72 000 in the ratio 3 : 5.

Calculate

- (i) Teboho's share,

M..... [2]

- (ii) the percentage of Sebolelo's share.

.....% [2]

- (b) Lebeha invested part of M10 000 at 2.5% per annum simple interest and the remaining amount at 1.9% per annum simple interest.
He obtained a total interest of M678 after three years.

Calculate the amount invested at 2.5%.

M [3]

- (c) The value of the car depreciates at the rate of 5% **every** year.
The value of the car is now M83 800.48.

Calculate the value of the car 7 years ago.

M [3]

- 2 The farmer sells beans in small packets each of mass 6 kg and large packets each of mass 10 kg.
He sells x small packets and y large packets.
Today, he sells more than 90 kg of beans.

(a) Show that $3x + 5y > 45$.

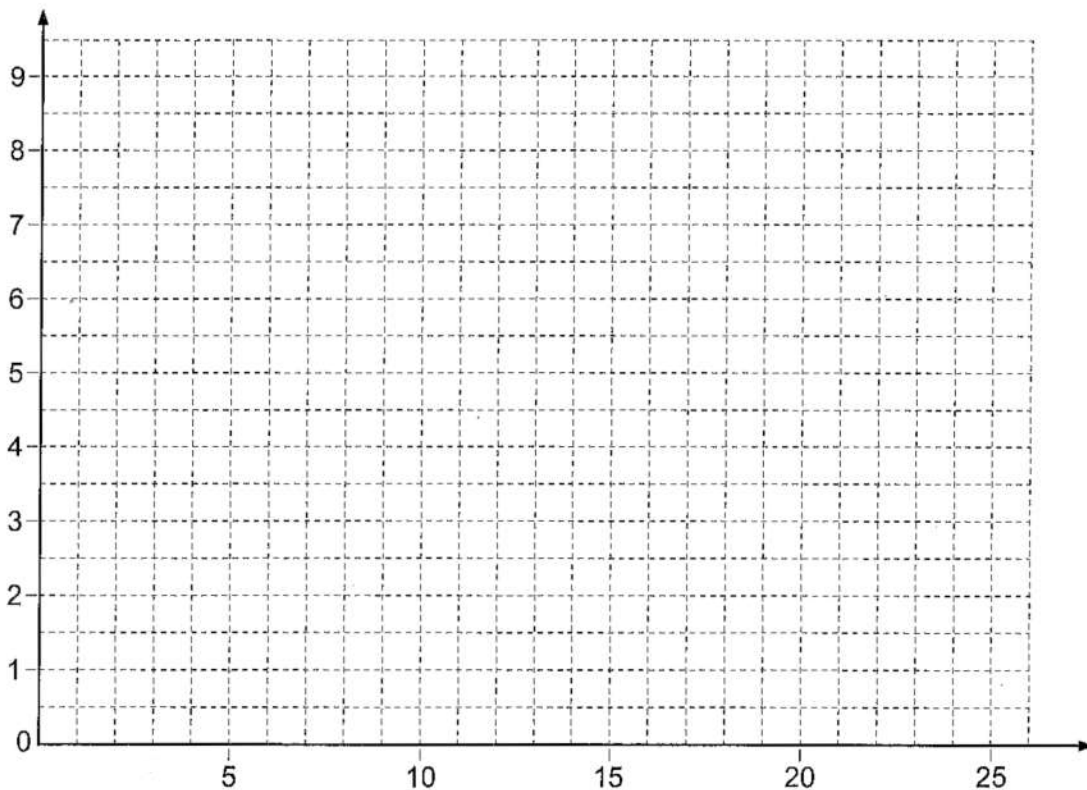
[1]

- (b) He sells more large packets than small packets.
He sells not more than 8 large packets.

Write two inequalities to show this information.

.....
.....[2]

- (c) Use the inequalities to determine the feasible region.



[3]

- (d) Find the smallest total mass of beans the farmer can sell.

..... kg [2]

- 3 The table shows the speed, s , of the cars in kilometres per hour (km/h), passing a particular point.

speed (km/h)	$40 < s \leq 50$	$50 < s \leq 60$	$60 < s \leq 64$	$64 < s \leq 70$	$70 < s \leq 80$
frequency	3	14	6	12	15

- (a) Calculate the sector angle for the speed $60 < s \leq 70$.

.....° [2]

- (b) Estimate the number of cars whose speed was less than 68 km/h.

..... [2]

- (c) Two cars are chosen at random.

Calculate the probability that one car had a speed greater than 70 km/h and the other had the speed of 60 km/h or less.

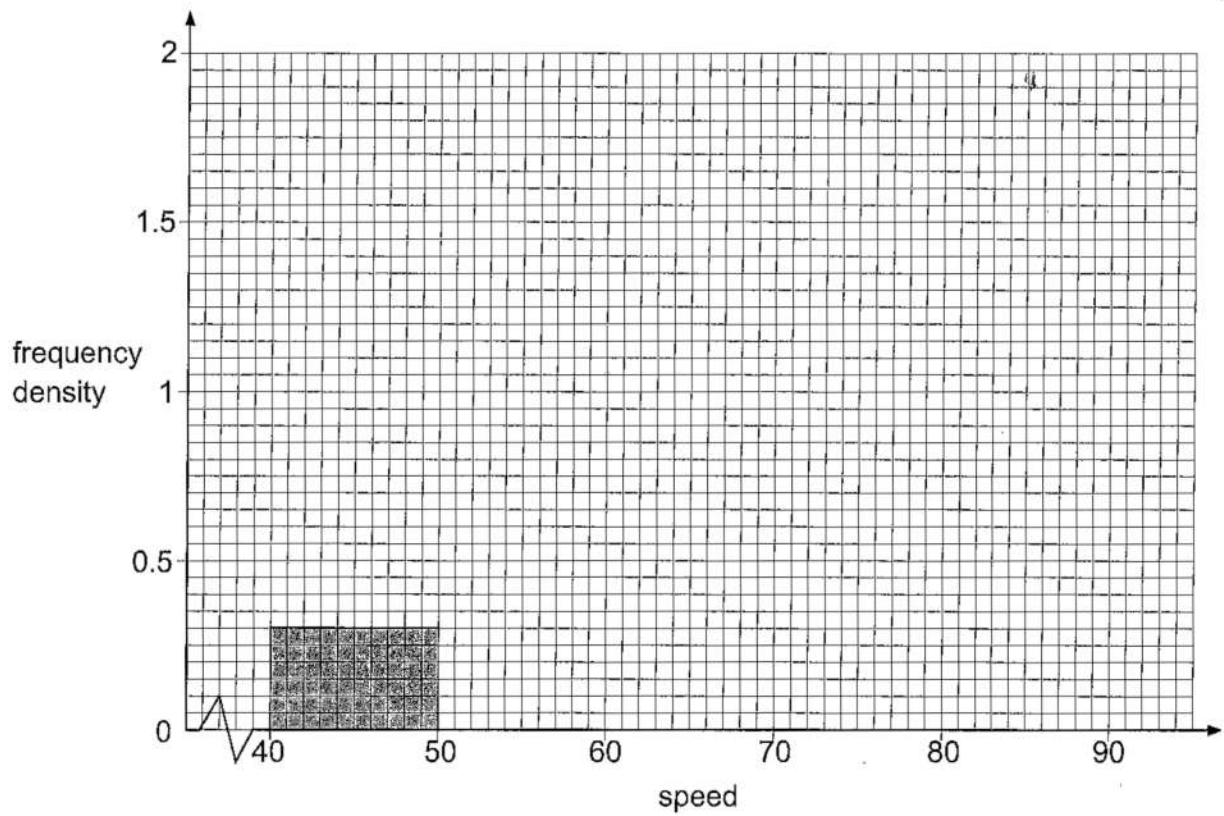
..... [2]

- (d) Calculate an estimate of the mean speed.

..... km/h [4]

- (e) Use the information from the table to complete the histogram.

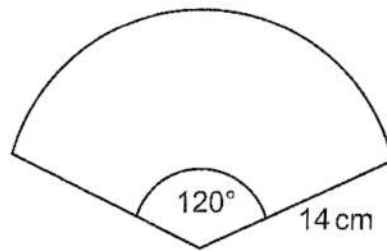
[3]



- (f) Hence, draw a frequency polygon.

[2]

- 4 (a) The diagram shows a sector of a circle which has radius 14 cm and an angle of 120° .

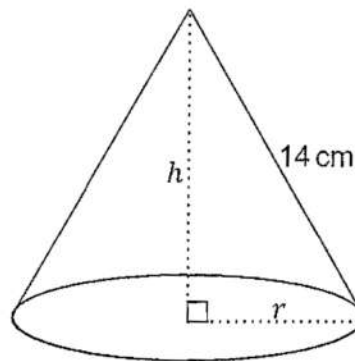


NOT TO
SCALE

- (i) Calculate the area of the sector.

- (ii) Show that the arc length of the sector is 29.3 correct to 1 decimal place. cm² [2]

- (iii) The diagram shows a cone made from the sector. [2]

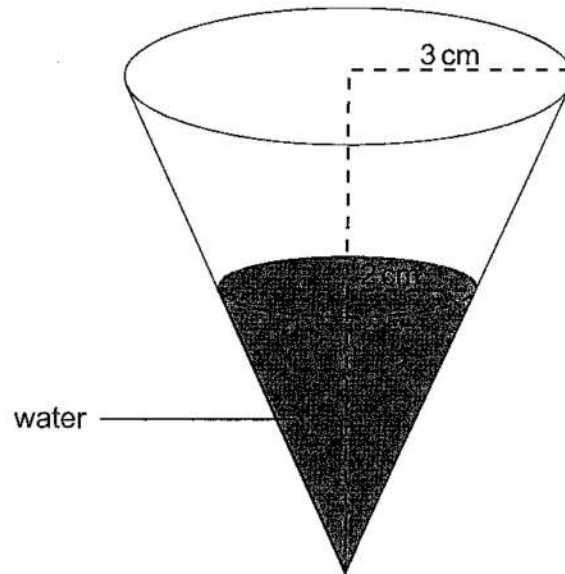


NOT TO
SCALE

Calculate the radius of the cone.

$r = \dots\dots\dots$ cm [2]

- (b) The diagram shows a cone with 33.5 cm^3 of water inside.
The radius of the cone is 3 cm while the radius at the level of the water is 2 cm.



NOT TO
SCALE

Calculate the volume of water needed to fill up the cone.

..... cm^3 [4]

- (c) Calculate the volume of the cylinder of height 2.5 m and radius of 0.8 m.

..... m^3 [2]

- 5 The probability that a plant produces flowers is 0.7.
The probability that the flowers are white is 0.4 and the probability that the flowers are yellow is 0.5.
Find the probability that

(a) the flower is neither white nor yellow,

..... [1]

(b) the plant produces flowers with white colours,

..... [1]

(c) the plant produces flowers which are either white or yellow.

..... [3]

- 6 Given the equation $4\sin(x - 3)^\circ = 3 + 2y$,

(a) find the value of y when $x = 33^\circ$,

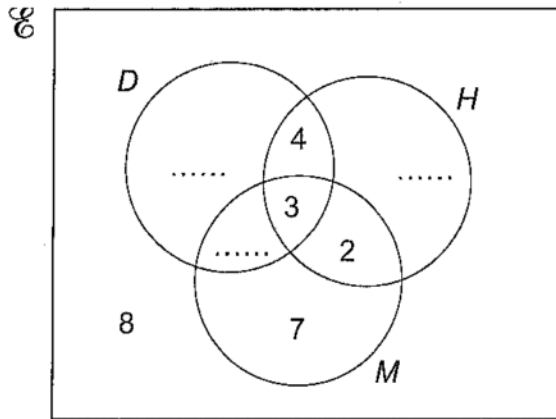
$y =$ [3]

(b) make x the subject of the formula.

..... [3]

- 7 Teachers submitted certificates for the teaching post.
 They submitted degree (D), honours (H), masters (M) and others.
 9 teachers submitted degree and masters.
 18 teachers submitted degree.
 20 teachers submitted **exactly one** of the three certificates.

(a) The Venn diagram shows some of the information for the number of teachers.



(i) Complete the Venn diagram.

[3]

(ii) Find the number of teachers who submitted masters' certificate **only**.

..... [1]

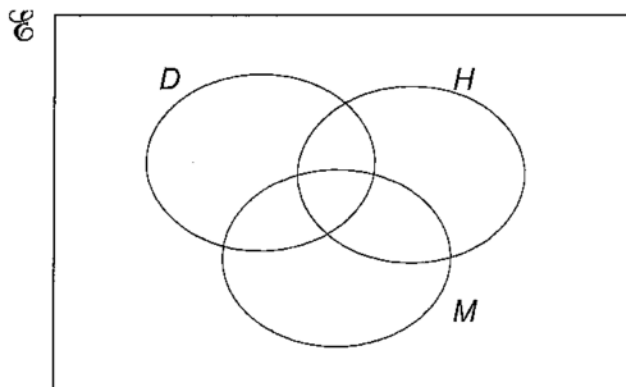
(iii) Use set notation to represent the number of teachers who submitted honours certificates only.

..... [2]

(iv) Find $n(H')$.

..... [1]

(b) Shade $(D' \cup H' \cap M)$ in the following Venn diagram.

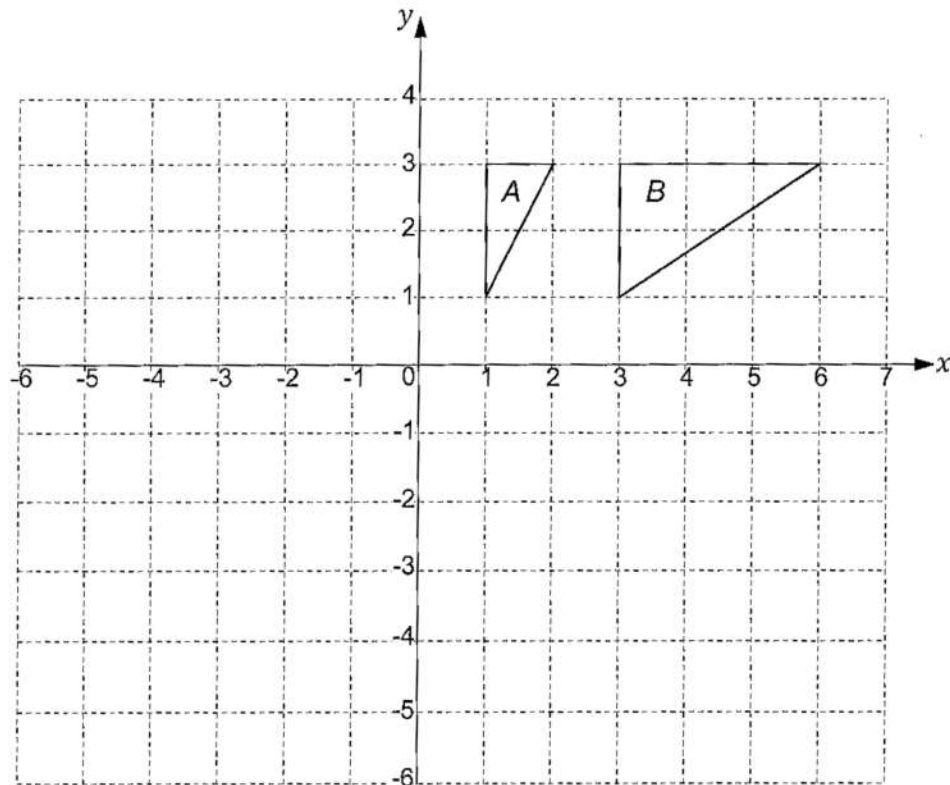


[1]

8 (a) Work out. $\begin{pmatrix} 1.2 & 0 \\ -2.7 & 2.1 \end{pmatrix} - \begin{pmatrix} -3.3 & -0.5 \\ 2.4 & 0 \end{pmatrix}$

..... [2]

(b) The diagram shows triangles A and B.



(i) Draw the image of triangle A after a translation using the vector $\begin{pmatrix} -4 \\ -6 \end{pmatrix}$. [2]

(ii) Find the magnitude of $\begin{pmatrix} -4 \\ -6 \end{pmatrix}$.

..... units [2]

(c) Describe fully a single transformation that maps triangle A onto B.

.....
 [3]

- 9 (a) Given the sequence 2,, 18, 54, 162,

find the 2nd term and the 6th term of the sequence.

2nd term =

6th term =[2]

- (b) Another sequence is given by -1, -1, 1, 5, 11, ...

Find the n th term of the sequence.

- (c) The 1st term and the 5th term of the sequence are 4 and 16 respectively.[3]

The n th term of the sequence is given by $T_n = a + d(n - 1)$.

Find

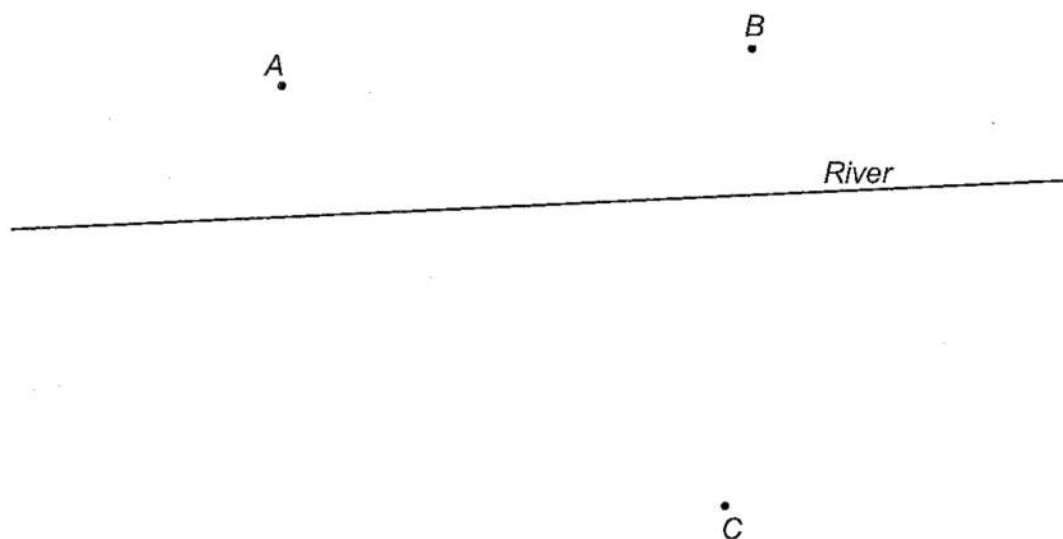
- (i) the common difference,

- (ii) the n th term.

.....[3]

.....[1]

- 10 The diagram shows the river and the positions of three villages A , B and C on the map. The map is drawn to scale.



- (a) Measure and write the distance BC .

..... cm [1]

- (b) The actual distance from A to B is 30 km.

Find the scale, in cm to km, that was used to draw the map.

1 cm is to km [3]

- (c) A bridge is to be constructed such that it is equidistant from AB and AC .

Construct and mark with M the position of the bridge.

[3]

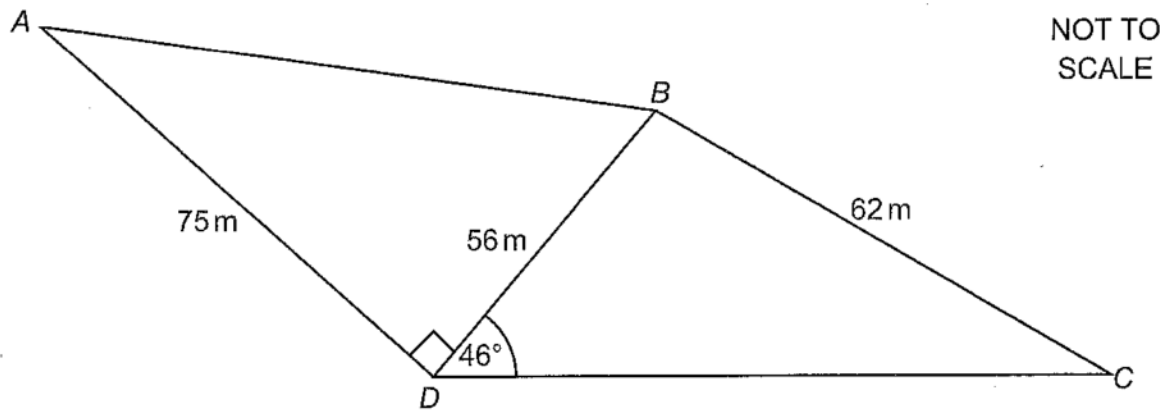
- (d) A perpendicular bisector of line AC is to be drawn.

Describe the locus of all points represented by the perpendicular bisector.

.....

..... [1]

- 11 The diagram shows quadrilateral $ABCD$ with a diagonal BD .
 $AD = 75\text{ m}$, $BC = 62\text{ m}$, $BD = 56\text{ m}$, $\widehat{ADB} = 90^\circ$ and $\widehat{BDC} = 46^\circ$.



(a) Calculate

(i) the length of AB ,

..... m [2]

(ii) the size of angle $\widehat{BCD}$.

.....° [3]

(b) Calculate the shortest distance from D to AB .

.....m [4]

12 $f(x) = 3x - 1$, $g(x) = x^2 - 1$ and $h(x) = 3^x$

(a) Find

(i) $h(2)$,

$h(2) = \dots\dots\dots [1]$

(ii) $f^{-1}(x)$,

$f^{-1}(x) = \dots\dots\dots [2]$

(iii) $fg(x)$ in its simplest form.

$\dots\dots\dots [2]$

(b) Find the value of x when

(i) $h(x) = 81$,

$x = \dots\dots\dots [2]$

(ii) $g(x) = f(x)$.

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

- 13** A tractor uses 6 litres of diesel to plough the first field of x hectares.

The rate of diesel consumption by the tractor is $\frac{6}{x}$ litres per hectare.

The tractor uses 8 litres of diesel to plough the second field of $(x + 20)$ hectares.

- (a)** Write an expression, in terms of x , for the rate of use of diesel on the second field.

..... litres per hectare [1]

- (b)** The rate of diesel consumption by the tractor in the second field was 1.5 litres per hectare less than in the first field.

Form an equation in x and show that it simplifies to $3x^2 + 64x - 240 = 0$.

[3]

- (c)** Solve the equation $3x^2 + 64x - 240 = 0$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [4]

- (d)** Find the rate of use of diesel by the tractor on the first field.

..... litres per hectare [1]

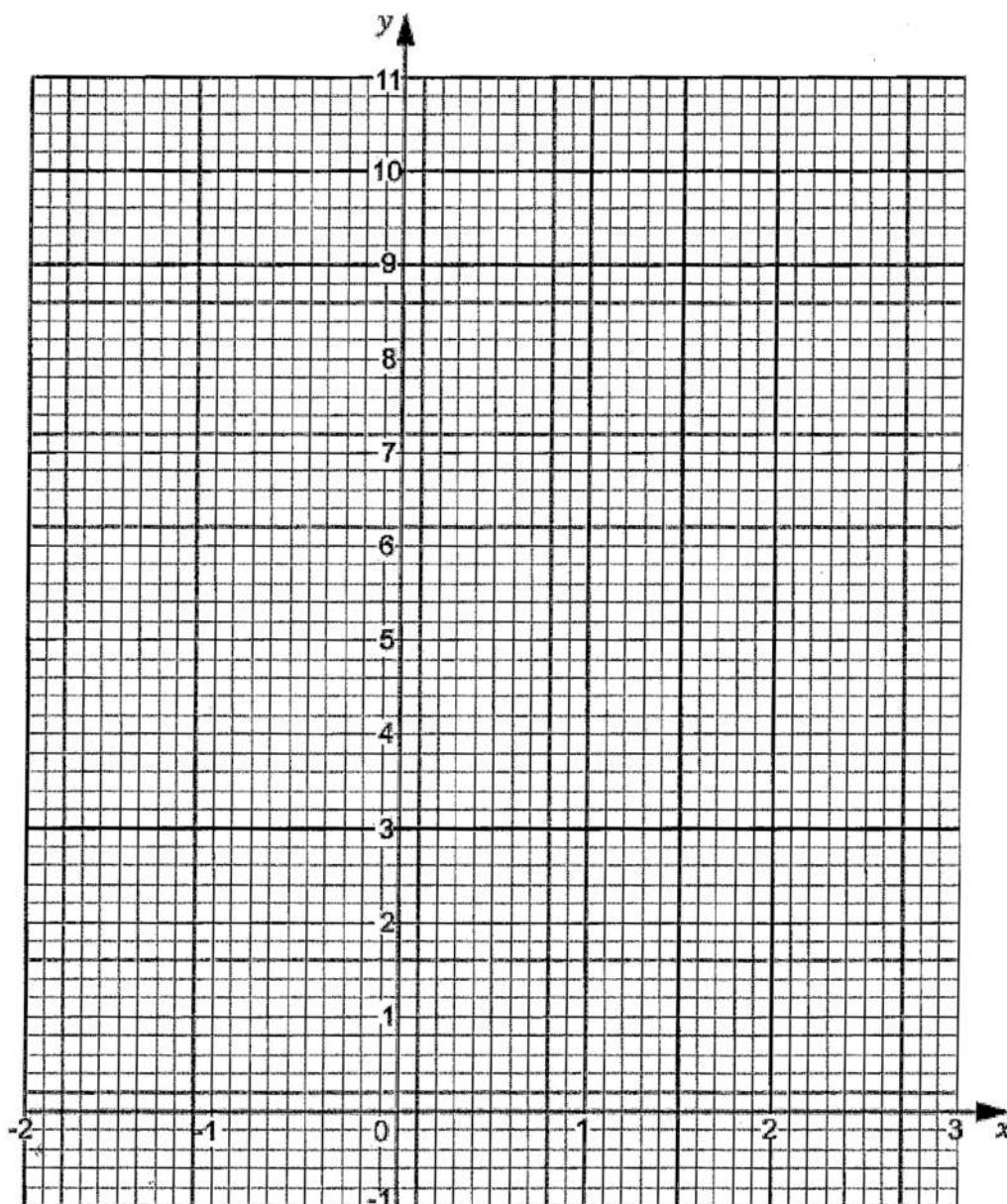
- 14 The table shows the corresponding values of x and y for $y = x^2 - 2x + 3$.

x	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2	3
y	11		6		3	2.3	2	2.3	3	6

- (a) Complete the table.

[2]

- (b) Draw the graph of $y = x^2 - 2x + 3$ for $-2 \leq x \leq 3$.



[3]

- (c) Use the graph to find the minimum value of $y = x^2 - 2x + 3$.

.....[1]

(d) By drawing a tangent, estimate the gradient of the curve at $x = 1.5$.

..... [3]

(e) By drawing a suitable line, solve the equation $x^2 - 2x + 1 = \frac{2}{3}x + 6$

$x =$ [3]

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