Centre Number	Candidate Number	Candidate Name

NAMIBIA SENIOR SECONDARY CERTIFICATE

MATHEMATICS ORDINARY LEVEL

4324/4

PAPER 4 (Extended)

2 hours 30 minutes

Marks 120

2020

Additional Materials: Geometrical instruments
Non-programmable calculator
Tracing paper (optional)

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Candidates answer on the Question Paper in the spaces provided.
- Write your Centre Number, Candidate Number and Name in the spaces at the top of this page.
- Write in dark blue or black pen.
- You may use a soft pencil for any diagrams or graphs.
- Do not use correction fluid.
- Do not write in the margin *For Examiner's Use*.

- Answer **all** questions.

- If working is needed for any question it must be shown below, or where working is indicated.
- The number of marks is given in brackets [ ] at the end of each question or part question.
- Non-programmable calculators may be used.
- 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 for angle sizes to **one** decimal place.
- For π, either use your calculator value, or use 3.142.

For Examiner's Use	
Marker	
Checker	

This document consists of **15** printed pages and **1** blank page.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

1 Three companies Avante, Badger and Economia, run car rental businesses. Their charges, based on the number of kilometres for which the car is driven and the time for which the car is rented are shown in the table below.

company	cost / day N$	cost / km N$
Avante	207.00	2.60
Badger	0.00	10.50
Economia	560.00	0.00

(a) Joel wishes to hire a car for 2 days to drive for 400 km to his destination.

(i) Show that if Joel hires a car from Avante company, his cost would be N$ 1 454.

Answer **(a)(i)**

[3]

(ii) Find the difference between the largest and smallest charges that Joel can pay.

Answer **(a)(ii)** N$ ..... [3]

(b) Linea hires a car for 3 days. She finds that hiring either Badger's cars or Economia's cars would cost the same.

How far does she intend to drive?

Answer **(b)** .....km [3]

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(c) Neema hired a car for 4 days from Economia company in 2019. He calculates that the cost of hiring a car was 25% more than it was in 2018.

Work out the cost of hiring a car for 4 days from Economia company in 2018.

Answer **(c)** N$..... [4]

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2 **(a)** Simplify $\dfrac{x^3 - xy^2}{2x^2 - 3x + 2xy - 3y}$ as far as possible.

Answer **(a)** ..... [4]

(b) Express $2 \log x - 3 \log y - 2$ as a single logarithm.

Answer **(b)** ..... [4]

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3 (a) Anna works as a casual worker at a mining company.
She works 8 hours per day for 6 days in a week.

(i) If her weekly wage is N$ 5 400, work out her hourly rate.

Answer **(a)(i)** N$ ..... [2]

(ii) One week, Anna was absent from work for some hours. Her wage for that week was decreased from N$ 5 400 in the ratio 3:5.

Calculate her wage for week 3.

Answer **(a)(ii)** N$ ..... [2]

(b) It is given that Alpha's weekly wage, w, varies proportionally to the square of the sum of the time in hours, x, worked per day plus a lunch hour, $(x + 1)^2$.
When w = N$ 666 then $x = 11$.

(i) Express w in terms of x.

Answer **(b)(i)** w = ... [4]

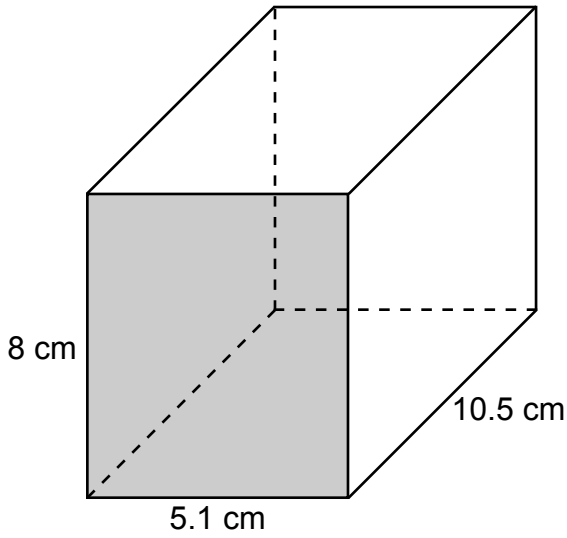
(ii) Work out Alpha's weekly hours, x, when $w = 1498.5$.

Show all your working.

Answer **(b)(ii)** x = ... hours [3]

4 A box of sweets has dimensions 5.1 cm by 8 cm by 10.5 cm.
All three measurements are correct to the nearest millimetre.

NOT TO SCALE



Calculate,

(a) the **least** possible perimeter of the shaded cross-section,

Answer **(a)** .....cm [4]

(b) the **greatest** possible volume of the box.

Answer **(b)** ..... cm^3 [3]

5 On the first part of a journey, José drove a distance of x km and his car used 5 litres of fuel.

The rate of fuel used by his car was $\frac{500}{x}$ litres per 100 km.

(a) José then drove another $(x + 10)$ km and his car used another 5 litres of fuel.

(i) Write down an expression, in terms of x, for the rate of fuel used by his car on this part of the journey.

Give your answer in litres per 100 km.

Answer **(a)(i)** ..... [1]

(ii) On this part of the journey, the rate of fuel used by the car **decreased** by 2.5 litres per 100 km from the rate of fuel used in the first part of the journey.

Show that $x^2 + 10x - 2000 = 0$.

Answer **(a)(ii)**

[4]

(b) Solve the equation $x^2 + 10x - 2000 = 0$.

Answer **(b)** x =.....or x = ... [3]

(c) Find the rate of fuel used by José's car for the complete journey.

Give your answer in litres per 100 km.

Answer **(c)** .....litres/100 km [2]

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6 The line PQR is a tangent to the circle with centre O at point Q. The line ABC intersects the circle at point B and the line PQR at point C. Angle OPQ = 40° and angle OEQ = 70°.

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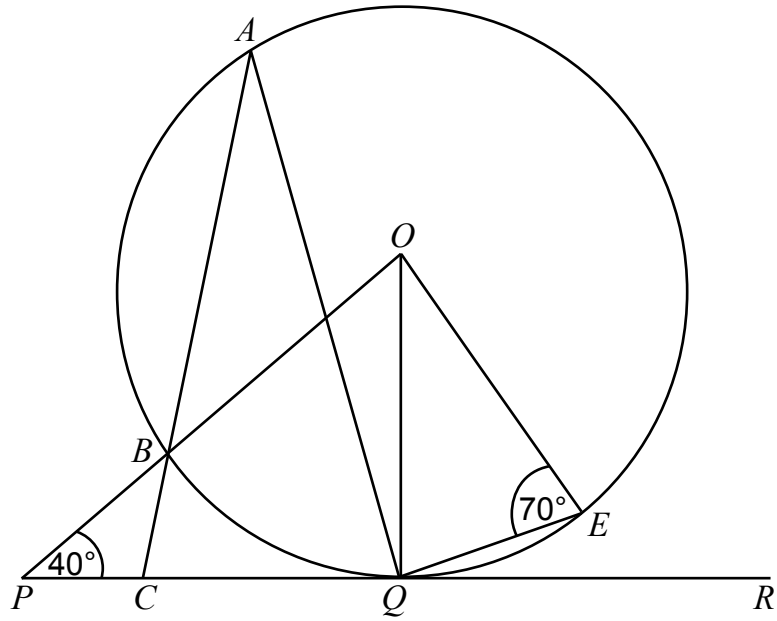

Write down,

(a) angle PQO, giving a reason for your answer,

Answer **(a)** ..... °

Reason:..... [2]

(b) Angle CAQ, giving a reason for your answer,

Answer **(b)** ..... °

Reason:..... [2]

(c) Calculate

(i) angle QOE,

Answer **(c)(i)** ..... [2]

(ii) angle EQR.

Answer **(c)(ii)** ..... [1]

7 **(a)** Complete the table of values for $y = \frac{3}{x^2} + 1 \quad (x \neq 0)$.

x	−3	−2.5	−2	−1.5	−1	−0.5	0.5	1	1.5	2	2.5	3
y	1.3	1.5			4	13	13	4			1.5	1.3

[2]

(b) Use the grid on page 9 to draw the graph of $y = \frac{3}{x^2} + 1 \quad (x \neq 0)$ for $-3 \leq x \leq 0.5$ and $0.5 \leq x \leq 3$.

Use 2 cm to represent 1 unit on both axes. [4]

(c) On the same grid, draw the graph of $y = -2x + 3$ for $-3 \leq x \leq 1.5$. [2]

(d) Use your graphs to solve the equations $y = \frac{3}{x^2} + 1 \quad (x \neq 0)$ and $y = -2x + 3$ simultaneously.

Answer **(d)** x =.....and y = ... [2]

(e) Estimate the gradient of the curve at point $x = 1.5$.

Answer **(e)** ..... [3]

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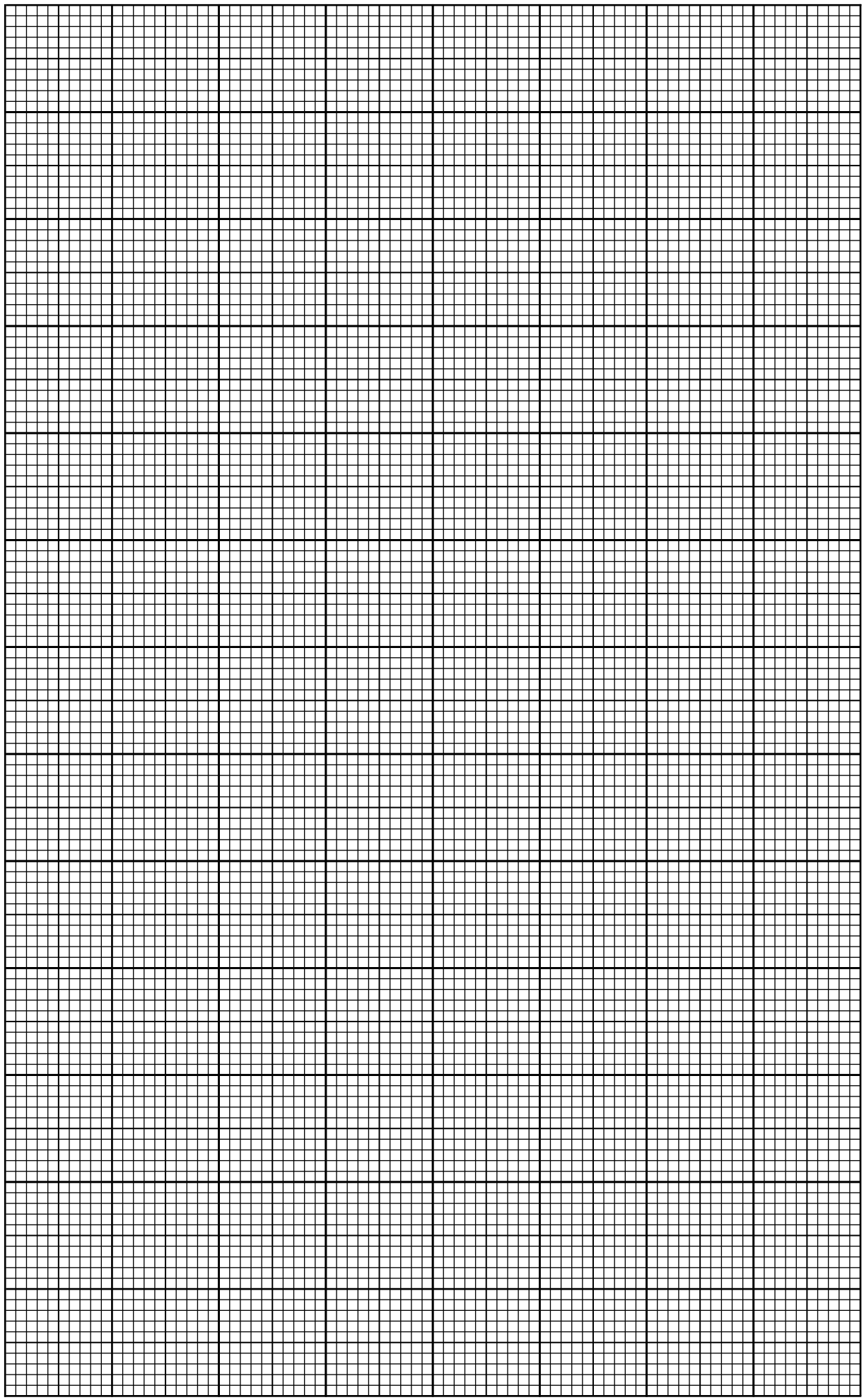
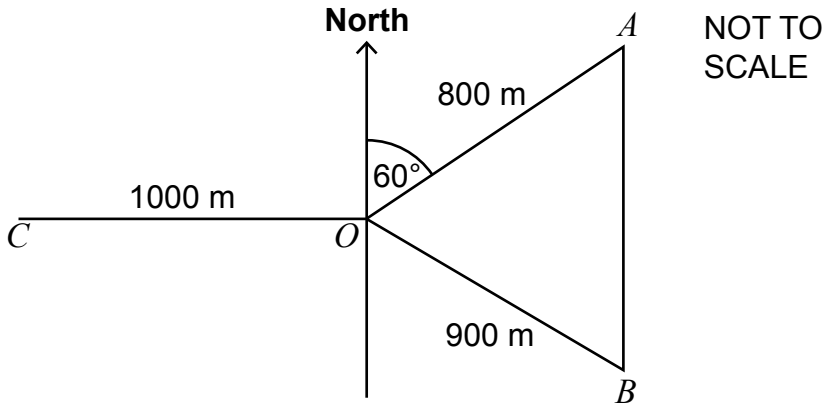


8 A land surveyor is carrying out a survey on a horizontal ground.
He observes that point A is 800 m away from O on a bearing of 060°.



The land surveyor also observes that point B is 900 m from O and due south of the point A. The point C is 1000 m due West of O.

(a) The land surveyor walks directly from C to A.

Calculate the distance from C to A.

Answer **(a)** ..... m [4]

(b) Calculate,

(i) the bearing of C from O,

Answer **(b)(i)** .....° [1]

(ii) the bearing of O from A,

Answer **(b)(ii)**.....° [2]

(iii) the angle OBA.

Answer **(b)(iii)**.....° [3]

(c) The land surveyor then walks from A towards B until he reaches a point P, where CP is a minimum.

Calculate the distance CP.

Answer **(c)** ..... m [3]

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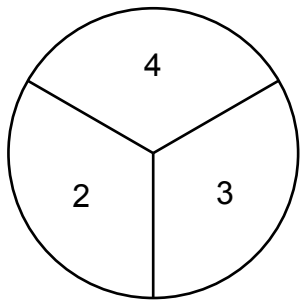
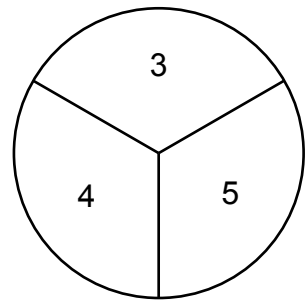
9 Two spinners are spun simultaneously and the scores are multiplied together.



Spinner 1



Spinner 2

(a) Complete the table for possible outcomes below.

Spinner 1 \ Spinner 2	3	4	5
2			
3			
4			

[3]

(b) Work out the probability of,

(i) scoring a number less than 15,

Answer **(b)(i)**..... [1]

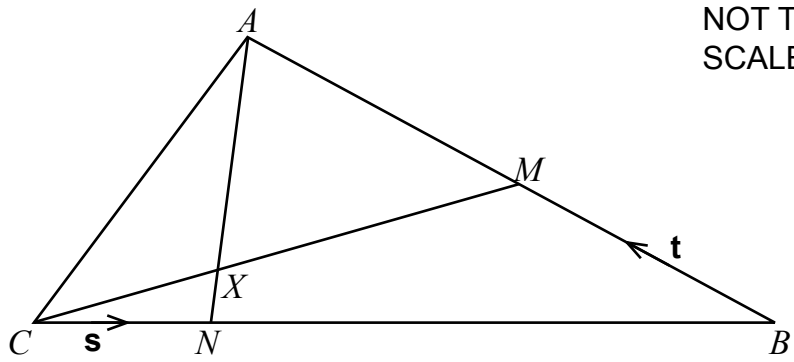
(ii) scoring a number more than 20,

Answer **(b)(ii)**..... [1]

(iii) scoring a number which is a multiple of 4.

Answer **(b)(iii)**..... [1]

10 In the diagram, $CB = 4CN$ and $NA = 5NX$. M is the midpoint of AB. $\overrightarrow{CN}$ = **s** and $\overrightarrow{BM}$ = **t**.



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(a) Express the following vectors in terms of **s** and or **t**.

(i) $\overrightarrow{NB}$.

Answer **(a)(i)** ..... [2]

(ii) $\overrightarrow{NA}$.

Answer **(a)(ii)** ..... [2]

(b) Show that $\overrightarrow{CX} = \frac{2}{5}(4\mathbf{s} + \mathbf{t})$

Answer **(b)**

[4]

(c) Calculate the value of,

(i) $\frac{CX}{CM}$,

Answer **(c)(i)** ..... [3]

(ii) $\frac{\text{Area of } \Delta ACX}{\text{Area of } \Delta ACM}$.

Answer **(c)(ii)** ..... [2]

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11 A is the point (1, 4) and B is the point (15, 10).
Find the equation of the perpendicular bisector of the line AB.
Give your answer in the form $ax + by = c$, where a, b and c are integers.

Answer ..... [7]

[Turn over

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12 The table below lists marks, x, which 32 learners scored in a Mathematics test.

marks	frequency
$31 \leq x \leq 40$	2
$41 \leq x \leq 50$	6
$51 \leq x \leq 60$	8
$61 \leq x \leq 70$	10
$71 \leq x \leq 90$	6

(a) Estimate the mean mark.

Answer **(a)** ..... [4]

(b) Complete the cumulative frequency table below.

marks	frequency
$x \leq 40$	2
$x \leq 50$	8
$x \leq 60$	
$x \leq 70$	
$x \leq 90$	32

[2]

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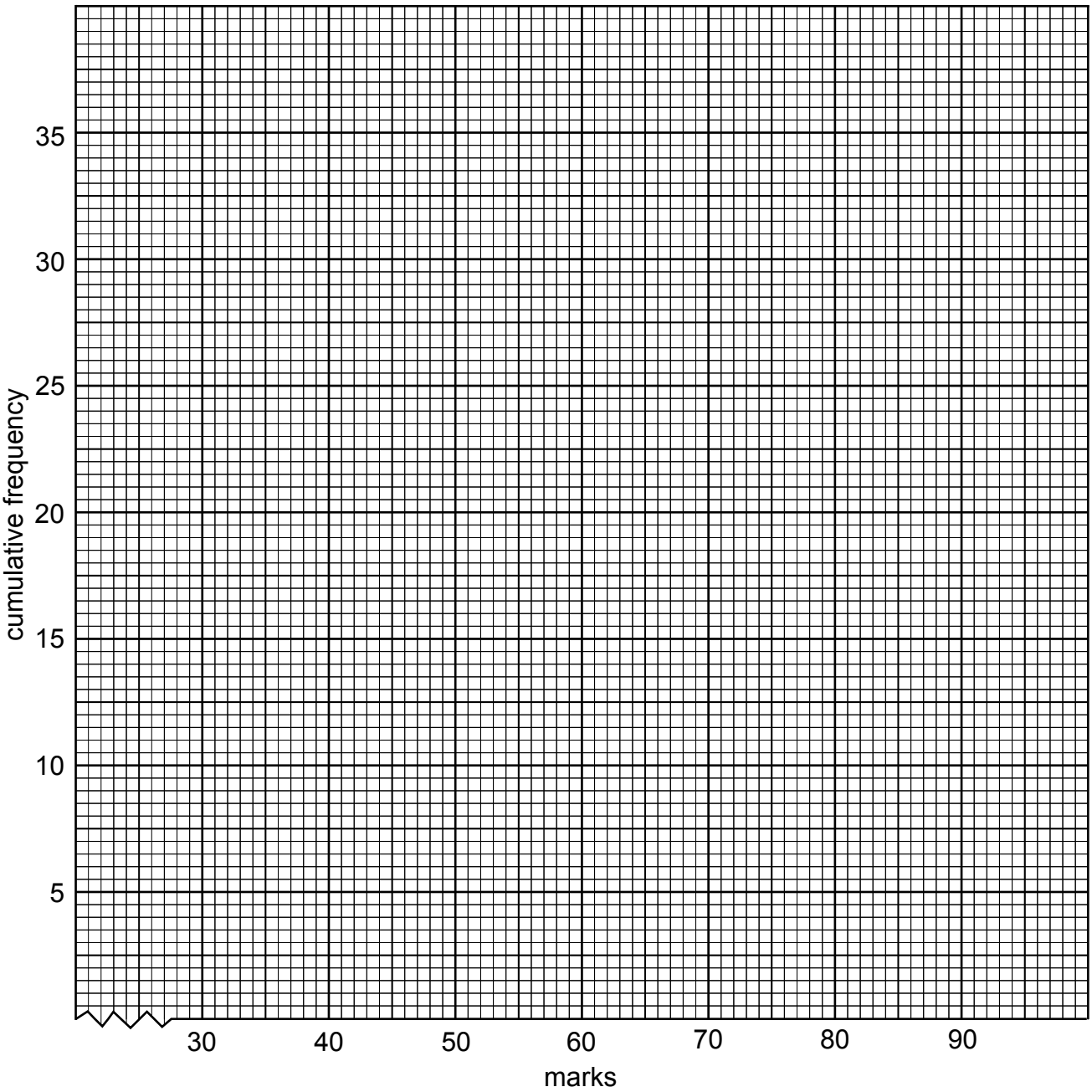
(c) Draw the cumulative frequency diagram on the grid below.



(d) Use your cumulative frequency diagram to estimate

(i) the interquartile range,

Answer **(d)(i)**..... [2]

(ii) the number of learners who scored less than 75 marks.

Answer **(d)(ii)**..... [1]

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