Centre Number	Candidate Number	Candidate Name

NAMIBIA SENIOR SECONDARY CERTIFICATE

MATHEMATICS ORDINARY LEVEL

4324/4

PAPER 4 (Extended)

2 hours 30 minutes

Marks 120

2018

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.

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Marker	
Checker	

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

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

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1 Taati Welding CC earns a monthly income of N$27 500 in January. Together, the water bill and electricity bill amount to $\frac{1}{8}$ of the monthly income.

The charges are as follows

Item	Basic fee	Charges
Water	N$81.88	N$23.02 per k$l$
Electricity	N$350.55	N$1.25 per unit

(a) Calculate the amount paid for both electricity and water bills in January.

Answer **(a)** N$ ..... [1]

(b) In January, Taati Welding CC used 1 800 units of electricity.

Calculate

(i) the total amount paid for electricity,

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

(ii) the total amount paid for water.

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

(c) In February, Taati Welding CC paid N$1 002.68 for the water bill.

Calculate the number of kilolitres (kl) of water used.

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

(d) In March, the ratio of the water bill : the electricity bill is 2 : 5.

N$2 800 was paid for the electricity bill.

Calculate the amount which was paid for the water bill.

Answer **(d)** N$ ..... [2]

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2 The table shows the Namibian tax rates for the 2015 − 2016 financial cycle.

Income bracket per year	Tax calculation
N$0 − N$50 000	No tax payable
N$50 001 − N$100 000	18% of amount above N$50 001
N$100 001 − N$300 000	N$9 000 + 25% of amount of taxable income above N$100 001
N$300 001 − N$500 000	N$59 000 + 28% of amount of taxable income above N$300 001
N$500 001 − N$800 000	N$115 000 + 30% of amount of taxable income above N$500 001
N$800 001 − N$1.5 million	N$205 000 + 32% of amount of taxable income above N$800 001
Above N$1.5 million	N$429 000 + 37% of amount of taxable income above N$1.5 million

(a) Ms Nicodemus is a cleaner at a rural school and she earns N$3 175 per month.

Determine whether she contributes towards the income tax fund by showing your working.

Answer **(a)**

[2]

(b) George earns N$215 000 per year. His allowable deductions amount to N$4 254 per month.

Calculate

(i) his taxable income for the year,

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

(ii) the amount of income tax deducted from his salary per month.

Answer **(b) (ii)** N$ ..... [4]

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3 **(a)** Solve for x and y

$4y^2 - 3x^2 = 1$,

$x + 2y = 1$.

Answer **(a)** x = ... , y = ...

or x = ... , y = ... [5]

(b) Write $\log\left(\frac{3x}{z}\right)$ as separate logarithms.

Answer **(b)** ..... [2]

(c) Write $\frac{x+2}{4} - \frac{2x-1}{3} + 2$ as a single fraction in its simplest form.

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

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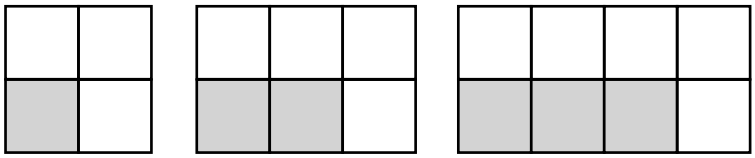
4 (a) The first three diagrams representing a sequence are shown below.

1st **2nd** **3rd** **4th**



(i) Draw the next diagram of the sequence in the space provided. [1]

(ii) Complete the table below.

Diagram	**1st**	**2nd**	**3rd**	**4th**	nth
Number of shaded squares	1	2	3		n
Number of unshaded squares	3	4	5		
Total number of squares	4	6	8		

[3]

(iii) Find which diagram has a total of 144 squares.

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

(b) The first four terms of a geometric sequence are 7, x, y, 56.

Determine

(i) the common ratio, r,

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

(ii) the value of x and y,

Answer **(b) (ii)** x = ... , y = ... [2]

(iii) the number of terms(n) of the sequence that will add up to 3 577.

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

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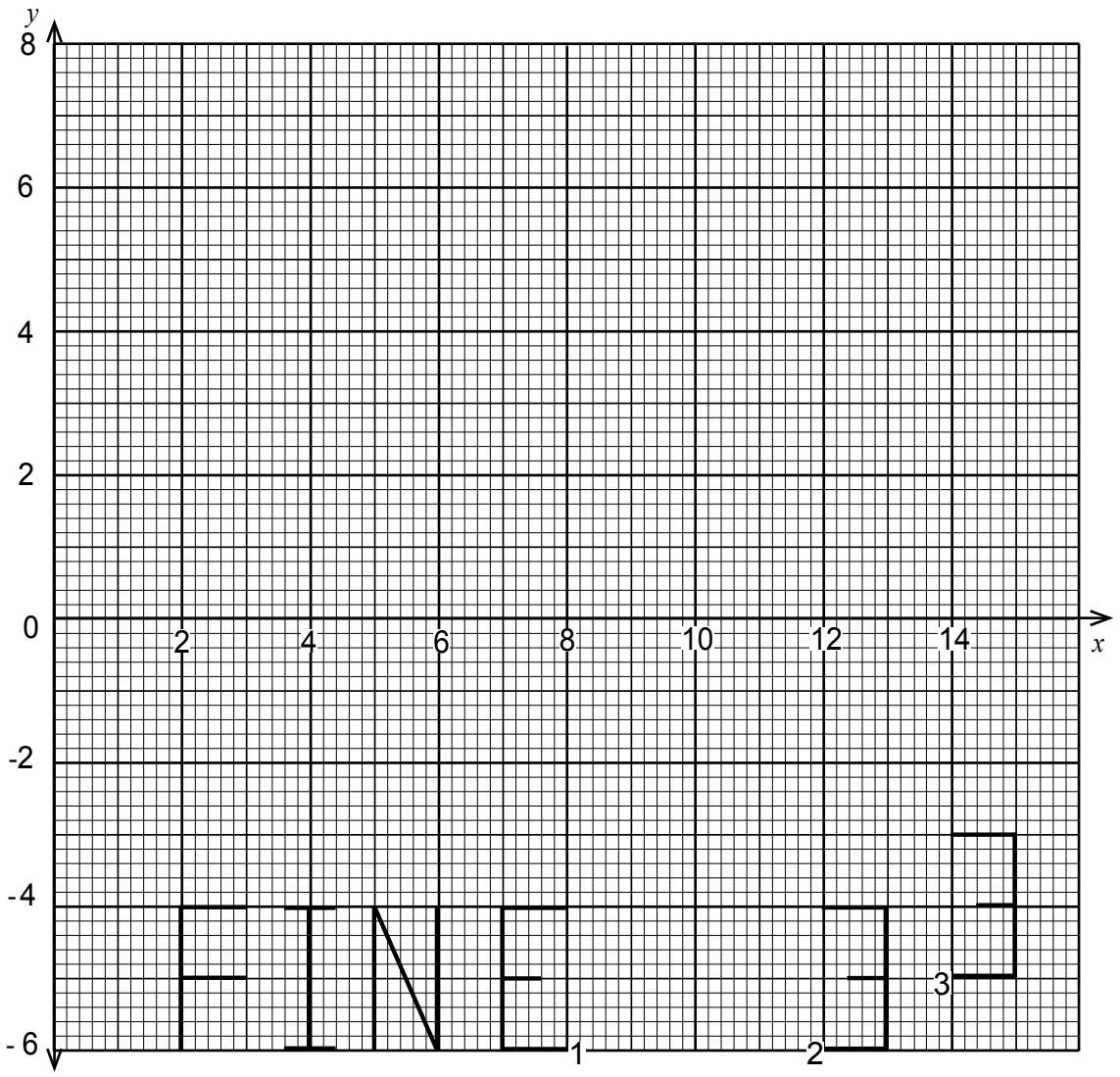
5



(a) Draw accurately the image of the letters under the following transformations.

(i) Enlarge letter N, using a scale factor of −2 and a centre of (7,−3). [2]

(ii) Translate letter I by the vector $\begin{pmatrix} -3 \\ 5 \end{pmatrix}$. Label it $\mathbf{I}_1$. [2]

(iii) Rotate letter F by 90° anticlockwise about (2,−4). [2]

(b) Describe fully the transformation which maps

(i) E_1 onto E_2,

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

(ii) E_2 onto E_3.

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

6 Mpande took part in a charity walk last year. She walked a distance of 30 kilometres.

(a) She received N$15 for each kilometre walked.

(i) Calculate the amount she raised by walking 30 kilometres.

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

(ii) The money she raised in **(a) (i)** was $\frac{3}{25}$ of the total amount raised by the charity.

Calculate the total amount raised by the charity walk.

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

(iii) This year the total raised by the charity walk organising committee is N$3 450. This amount is 15% more than it was two years ago.

Calculate the amount of money raised two years ago.

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

(b) Part of the 30 kilometres walked was on a tarred road and the rest was on a footpath.

The ratio of the walked distance on the tarred road to the footpath was 4 : 1.

Work out the distance walked on the tarred road.

Answer **(b)** .....km [2]

7 The table below shows the values of $y = -\frac{3}{x}$ ($x \neq 0$). The y - values are correct to one decimal place.

x	-3	-2.5	-2	-1.5	-1	-0.5		0.5	1	1.5	2	2.5	3
y	1	s	1.5	2	t	6		u	-3	-2	-1.5	-1.2	-1

(a) Calculate the values of s, t and u.

Answer **(a)** s = ... t = ... u = ... [3]

Use the grid on page 9 to answer the following questions.

(b) Draw the graph of $y = -\frac{3}{x}$ for $-3 \leq x \leq -0.5$ and $0.5 \leq x \leq 3$ on the grid provided. [5]

(c) (i) On the same grid, draw the line $y = -x$. [1]

(ii) Use your graphs to solve $-\frac{3}{x} = -x$.

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

(d) (i) Draw a tangent to $y = -\frac{3}{x}$ at $x = 1$. [1]

(ii) Estimate the gradient of $y = -\frac{3}{x}$ at $x = 1$.

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

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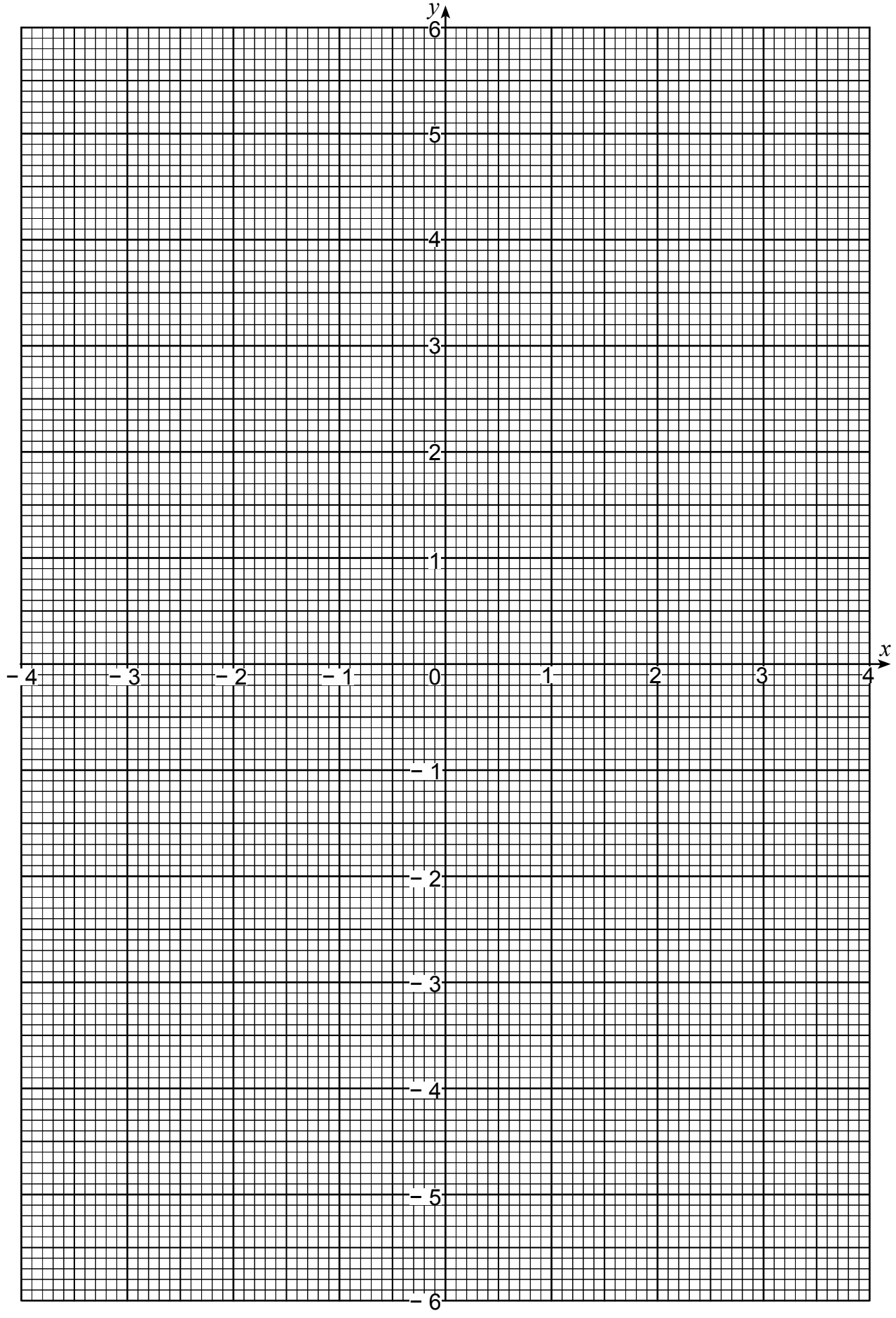

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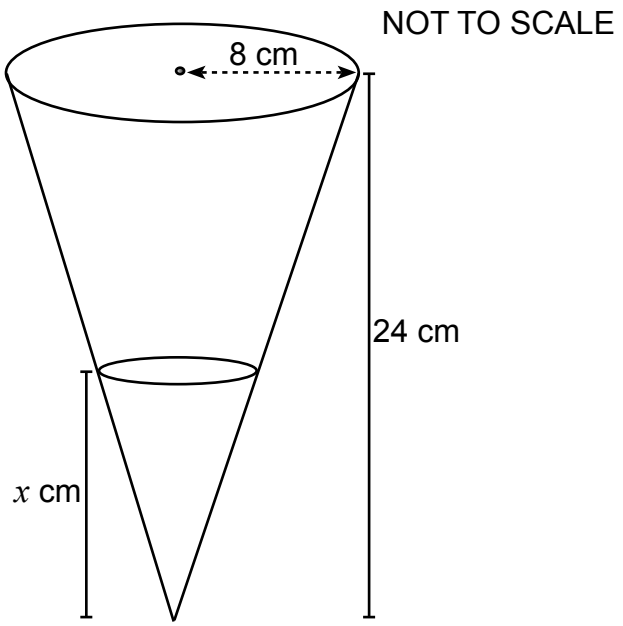
8 A water funnel has a radius of 8 cm and height of 24 cm as shown in the diagram.



(a) Calculate the capacity of the funnel.

[The volume of a cone of radius, r, and height, h, is $\frac{1}{3}\pi r^2 h$].

Answer **(a)** ..... cm^3 [2]

(b) Calculate the surface area of the funnel.

[Surface area of a cone of radius, r, and a slant height, l, is πrl].

Answer **(b)** ..... cm^2 [3]

(c) After a heavy shower of rain the funnel is full to a height of 6 cm.

If the funnel was empty before the shower, calculate the volume of water in the funnel.

Answer **(c)** ..... cm^3 [2]

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(d) If the height of water in the funnel is x cm,

(i) find the radius of the circular surface area of the water in terms of x,

Answer **(d) (i)** .....cm [1]

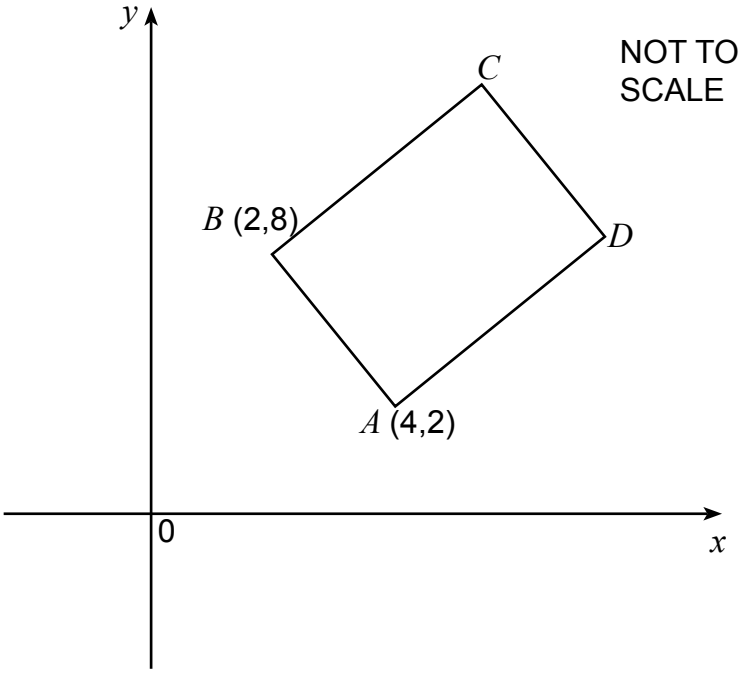
(ii) find the formula for the volume of water, in terms of π and x, in its simplest form,

Answer **(d) (ii)** ..... [3]

(iii) show that, when x = 6 cm, your formula gives the same answer a **(c)**.

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

9 The diagram shows a rectangle $ABCD$. A and B have the points (4,2) and (2,8) respectively. The equation of AC is $y = x - 2$.



Find

(a) the equation of line BC,

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

(b) the co-ordinates of point C,

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

(c) the length of AB.

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

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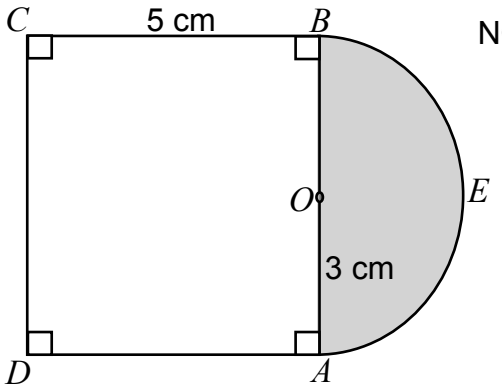
10 A piece of cloth is cut to form the shape shown in the diagram. $ABCD$ is a rectangle. AEB is a semicircular arc, centre O, of radius 3 cm, $AB = DC$ and $AD = BC = 5$ cm.



Calculate

(a) (i) the arc length AEB,

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

(ii) the perimeter of the shape $AEBCD$,

Answer **(a) (ii)** ..... cm [3]

(b) (i) the area of sector ABE,

Answer **(b) (i)** ..... cm^2 [2]

(ii) the area of shape $AEBCD$.

Answer **(b) (ii)** ..... cm^2 [2]

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11 The time taken, t in minutes, by 500 community members to clear a portion of land for the construction of houses is given in the table below.

Time (t minutes)	$35 < t \leq 45$	$45 < t \leq 55$	$55 < t \leq 65$	$65 < t \leq 75$	$75 < t \leq 85$	$85 < t \leq 95$
Frequency	60	160	190	65	10	15

(a) (i) Write down the modal class.

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

(ii) Calculate an estimate of the mean time taken to complete the cleaning task.

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

(b) Complete the cumulative frequency table for the time taken to complete the cleaning task.

Time (t minutes)	≤ 35	≤ 45	≤ 55	≤ 65	≤ 75	≤ 85	≤ 95
Frequency	0			410			500

[2]

(c) Using a scale of 2 cm to represent 10 minutes on the horizontal axis and 2 cm to represent 50 community members on the vertical axis, draw a cumulative frequency curve to illustrate this information.
Use the grid on page 15. [5]

(d) Use your graph to find

(i) the median time taken,

Answer **(d) (i)** ..... minutes [1]

(ii) the interquartile range,

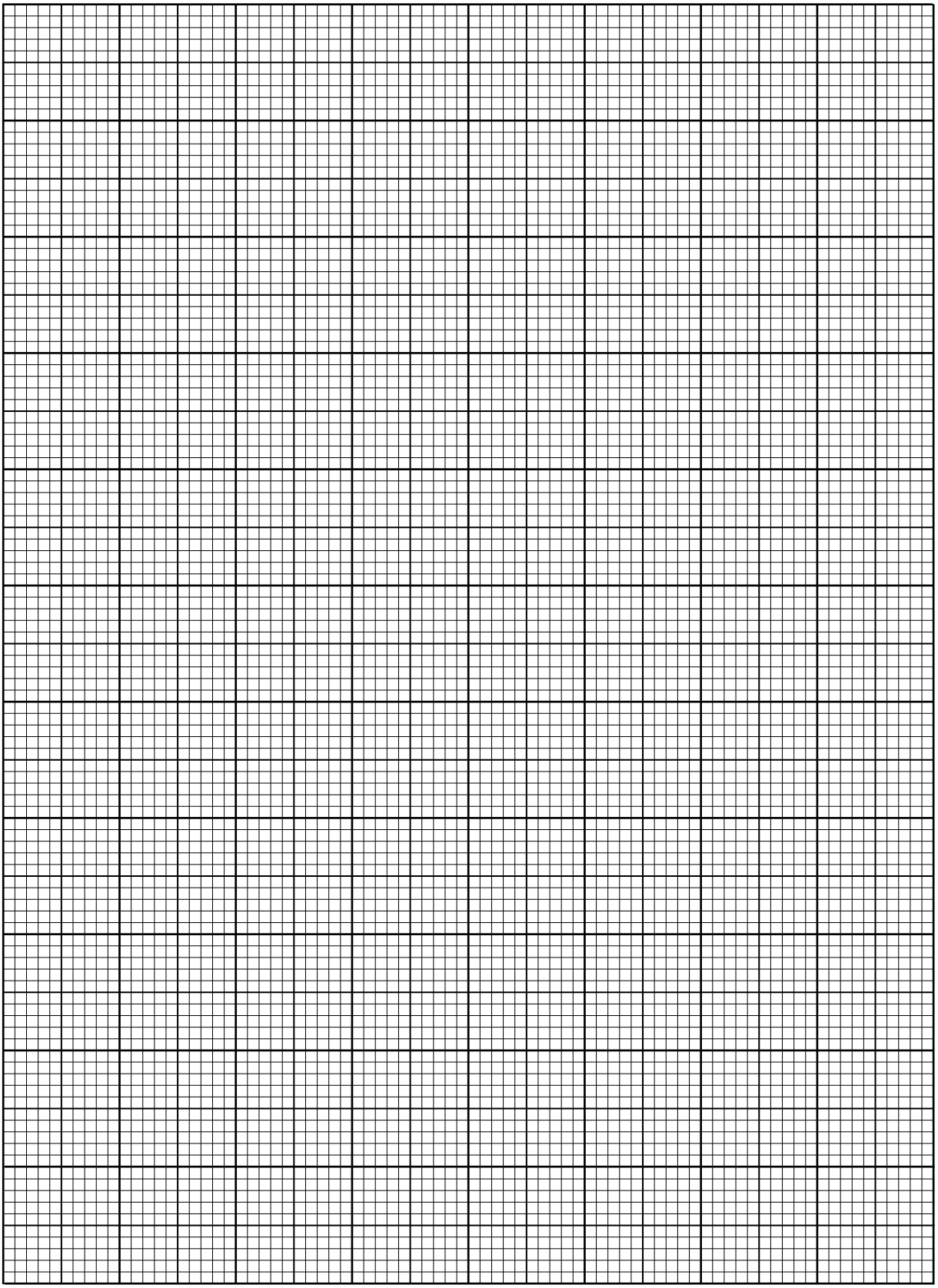
Answer **(d) (ii)** .....minutes [2]

(iii) the 55th percentile,

Answer **(d) (iii)** .....minutes [1]

(iv) the probability that a community member is chosen at random from the task took more than 70 minutes.

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



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