

- 1 A film company uses 512 actors in a film.
The actors are in the ratio men : women : children = 7 : 11 : 14.

- (a) (i) Show that there are 224 children in the film.

Answer(a)(i)

[2]

- (ii) Find the number of men in the film.

Answer(a)(ii) [1]

- (b) Every working day, each child is given \$1 to spend.
Each child works for 45 days.

Calculate the total amount that the film company gives the children to spend.
Give your answer correct to the nearest \$100.

Answer(b) \$ [2]

- (c) The children have lessons every day in groups of no more than 12.

Calculate the smallest possible number of groups.

Answer(c) [2]

- (d) The film costs four million and ninety three thousand dollars to make.

- (i) Write this number in figures.

Answer(d)(i) [1]

- (ii) Write your answer to **part (d)(i)** in standard form.

Answer(d)(ii) [1]

- (e) A DVD copy of the film costs \$2.75 to make.
The selling price is \$8.20 .

Calculate the percentage profit.

Answer(e)% [3]

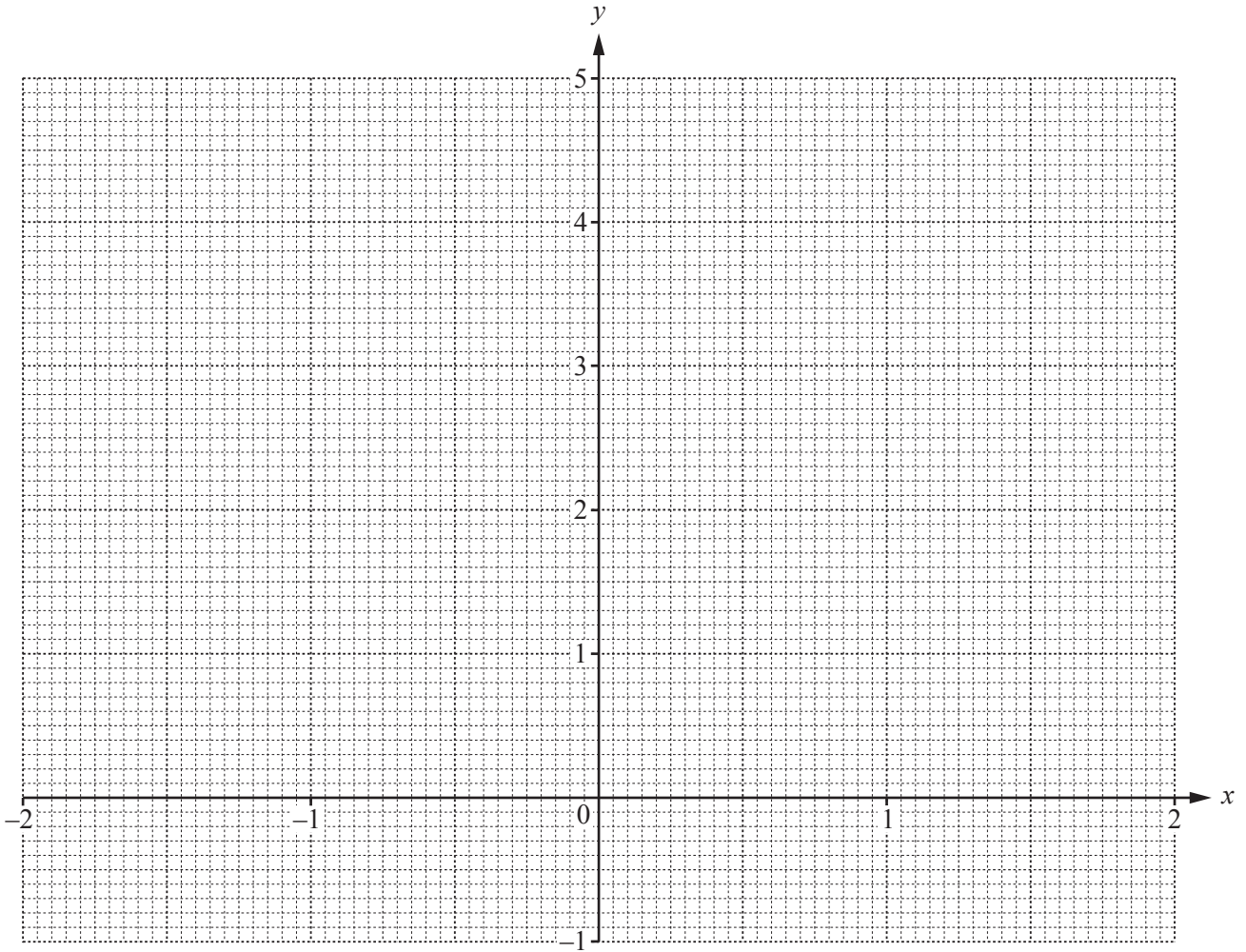
2 The table shows some values for $y = x^3 - 3x + 2$.

x	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2
y		3.125		3.375	2		0		4

(a) Complete the table of values.

[4]

(b) On the grid, draw the graph of $y = x^3 - 3x + 2$ for $-2 \leq x \leq 2$.



[4]

(c) By drawing a suitable line, solve the equation $x^3 - 3x + 2 = x + 1$ for $-2 \leq x \leq 2$.

Answer(c) $x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

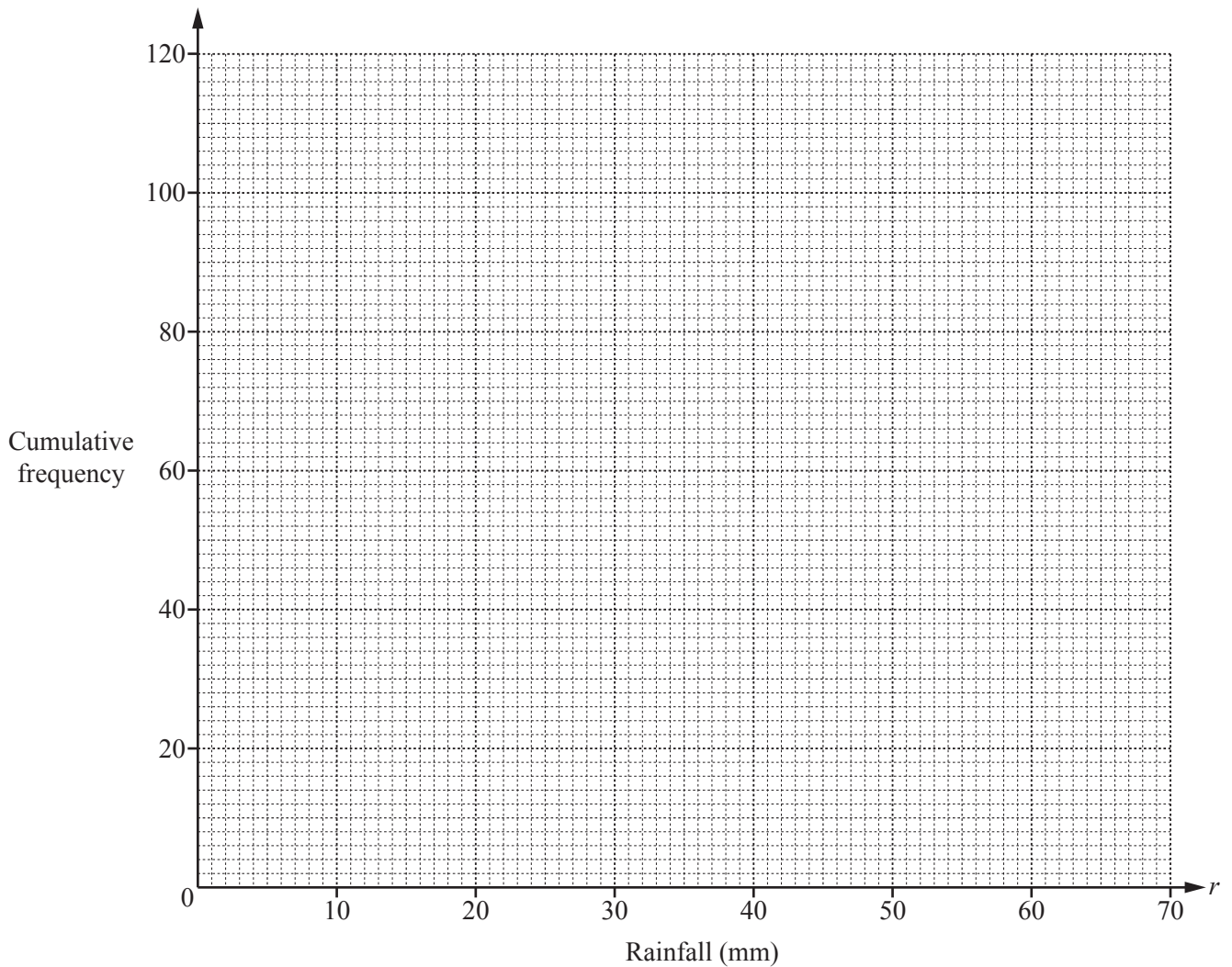
(d) By drawing a suitable tangent, find an estimate of the gradient of the curve at the point where $x = -1.5$.

Answer(d) $\dots\dots\dots$ [3]

- 3 Leo measured the rainfall each day, in millimetres, for 120 days.
The cumulative frequency table shows the results.

Rainfall (r mm)	$r \leq 20$	$r \leq 25$	$r \leq 35$	$r \leq 40$	$r \leq 60$	$r \leq 70$
Cumulative frequency	5	13	72	90	117	120

- (a) On the grid below, draw a cumulative frequency diagram to show these results.



[3]

- (b) (i) Find the median.

Answer(b)(i) mm [1]

- (ii) Use your diagram to find the number of days when the rainfall was more than 50 mm.

Answer(b)(ii) [2]

(c) Use the information in the cumulative frequency table to complete the frequency table below.

Rainfall (r mm)	$0 < r \leq 20$	$20 < r \leq 25$	$25 < r \leq 35$	$35 < r \leq 40$	$40 < r \leq 60$	$60 < r \leq 70$
Frequency	5		59			3

[2]

(d) Use your frequency table to calculate an estimate of the mean.
You must show all your working.

Answer(d) mm [4]

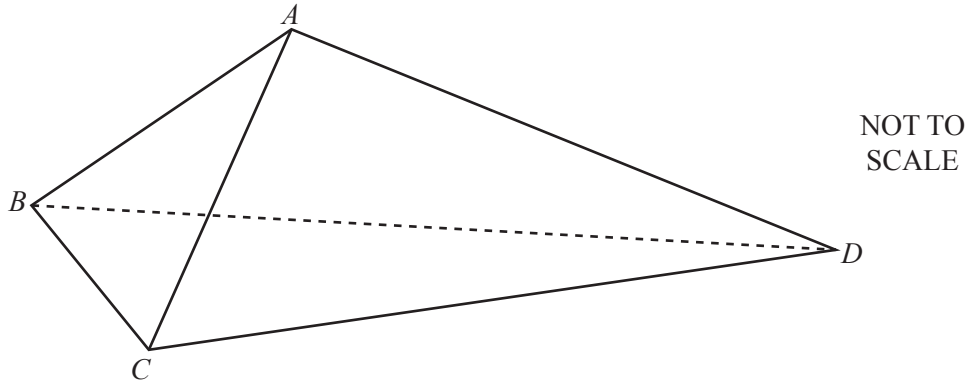
(e) In a histogram drawn to show the information in the table in **part (c)**, the frequency density for the interval $25 < r \leq 35$ is 5.9 .

Calculate the frequency density for the intervals $20 < r \leq 25$, $40 < r \leq 60$ and $60 < r \leq 70$.

Answer(e) $20 < r \leq 25$

$40 < r \leq 60$

$60 < r \leq 70$ [4]



The diagram shows a tent $ABCD$.

The front of the tent is an isosceles triangle ABC , with $AB = AC$.

The sides of the tent are congruent triangles ABD and ACD .

- (a) $BC = 1.2$ m and angle $ABC = 68^\circ$.

Find AC .

Answer(a) $AC = \dots\dots\dots$ m [3]

- (b) $CD = 2.3$ m and $AD = 1.9$ m.

Find angle ADC .

Answer(b) Angle $ADC = \dots\dots\dots$ [4]

- (c) The floor of the tent, triangle BCD , is also an isosceles triangle with $BD = CD$.

Calculate the area of the floor of the tent.

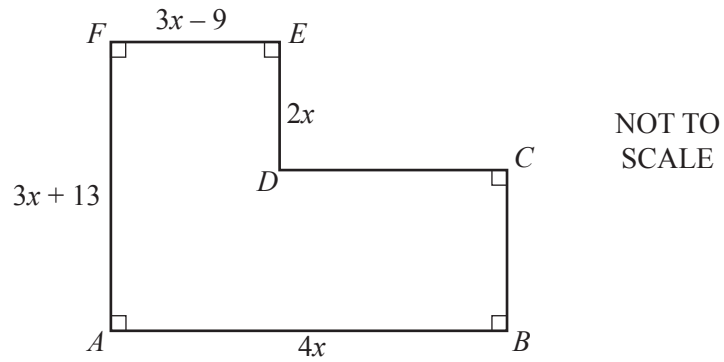
Answer(c)m² [4]

- (d) When the tent is on horizontal ground, A is a vertical distance 1.25 m above the ground.

Calculate the angle between AD and the ground.

Answer(d) [3]

- 5 (a) The area of shape $ABCDEF$ is 24 cm^2 .
All lengths are in centimetres.



- (i) Show that $5x^2 + 17x - 12 = 0$.

Answer(a)(i)

[3]

- (ii) Solve, by factorising, the equation $5x^2 + 17x - 12 = 0$.
You must show all your working.

Answer(a)(ii) $x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

- (b) Solve the simultaneous equations.
You must show all your working.

$$\begin{aligned}3x - 2y &= 23 \\ -4x - y &= -5\end{aligned}$$

Answer(b) $x = \dots\dots\dots$

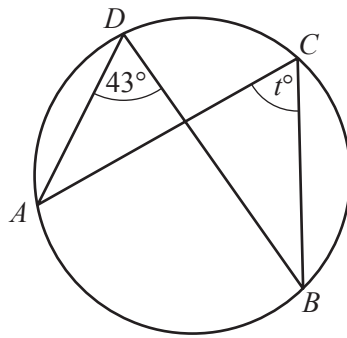
$y = \dots\dots\dots$ [3]

- (c) Solve the equation.

$$\frac{2(t+3)}{t} - \frac{t}{t+3} = 1$$

Answer(c) $t = \dots\dots\dots$ [5]

- 6 (a) (i) A, B, C and D lie on the circumference of the circle.

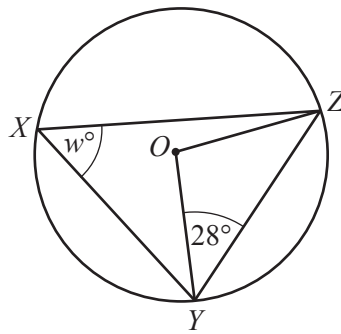


NOT TO SCALE

Find the value of t .

Answer(a)(i) $t = \dots\dots\dots$ [1]

- (ii) X, Y and Z lie on the circumference of the circle, centre O .



NOT TO SCALE

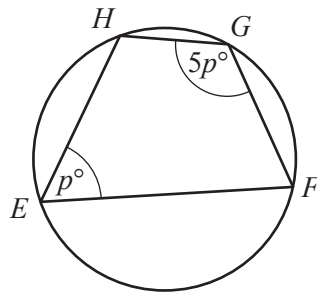
Find the value of w , giving reasons for your answer.

Answer(a)(ii) $w = \dots\dots\dots$ because $\dots\dots\dots$

$\dots\dots\dots$

$\dots\dots\dots$ [3]

(iii) E, F, G and H lie on the circumference of the circle.



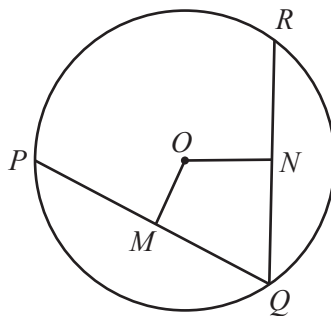
NOT TO SCALE

Find the value of p , giving a reason for your answer.

Answer(a)(iii) $p = \dots\dots\dots$ because $\dots\dots\dots$

$\dots\dots\dots$ [3]

(b)



NOT TO SCALE

The diagram shows a circle, centre O .
 PQ and QR are chords.
 OM is the perpendicular from O to PQ .

(i) Complete the statement.

$PM : PQ = \dots\dots\dots : \dots\dots\dots$ [1]

(ii) ON is the perpendicular from O to QR and $PQ = QR$.

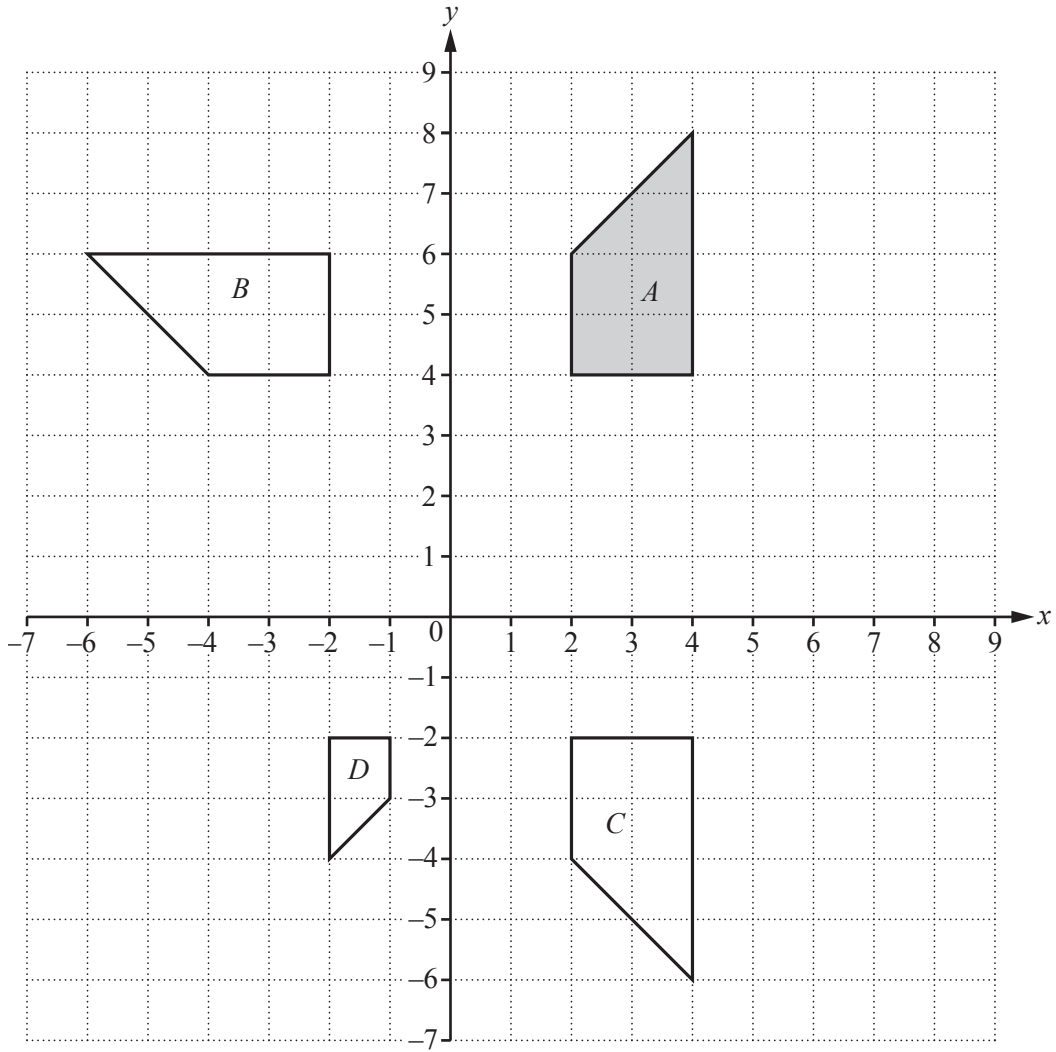
Complete the statements to show that triangle OMQ is congruent to triangle ONQ .

$\dots\dots\dots$ is a common side.

$\dots\dots\dots = \dots\dots\dots$ because M is the midpoint of PQ and N is the midpoint of RQ .

$\dots\dots\dots = \dots\dots\dots$ because equal chords are equidistant from $\dots\dots\dots$

[4]



(a) Describe fully the **single** transformation that maps

(i) shape *A* onto shape *B*,

Answer(a)(i) [3]

(ii) shape *A* onto shape *C*,

Answer(a)(ii) [2]

(iii) shape *A* onto shape *D*.

Answer(a)(iii) [3]

(b) Find the 2×2 matrix that represents the transformation in **part (a)(iii)**.

Answer(b) $\left(\begin{array}{cc} & \\ & \end{array} \right)$ [2]

(c) On the grid, draw the image of shape A after a translation by the vector $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$. [2]

(d) Describe fully the **single** transformation represented by the matrix $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$.

Answer(d)

..... [2]

8 A line AB joins the points $A(3, 4)$ and $B(5, 8)$.

(a) Write down the co-ordinates of the midpoint of the line AB .

Answer(a) (..... ,) [2]

(b) Calculate the distance AB .

Answer(b) $AB =$ [3]

(c) Find the equation of the line AB .

Answer(c) [3]

(d) A line perpendicular to AB passes through the origin and through the point $(6, r)$.

Find the value of r .

Answer(d) $r =$ [3]

9

$f(x) = 2x + 5$

$g(x) = 2^x$

$h(x) = 7 - 3x$

(a) Find

(i) $f(3)$,*Answer(a)(i)* [1](ii) $gg(3)$.*Answer(a)(ii)* [2](b) Find $f^{-1}(x)$.*Answer(b)* $f^{-1}(x) =$ [2](c) Find $fh(x)$, giving your answer in its simplest form.*Answer(c)* [2](d) Find the integer values of x which satisfy this inequality.

$$1 < f(x) \leq 9$$

Answer(d) [3]

Question 10 is printed on the next page.

10 The table shows the first five terms of sequences A, B and C.

Sequence	1st term	2nd term	3rd term	4th term	5th term	6th term
A	3	4	5	6	7	
B	0	1	4	9	16	
C	-3	-3	-1	3	9	

(a) Complete the table for the 6th term of each sequence. [2]

(b) Write down the n th term of sequence A.

Answer(b) [1]

(c) (i) Find the n th term of sequence B.

Answer(c)(i) [2]

(ii) Find the value of n when the n th term of sequence B is 8281.

Answer(c)(ii) $n =$ [2]

(d) (i) Find the n th term of sequence C in its simplest form.

Answer(d)(i) [2]

(ii) Find the 8th term of sequence C.

Answer(d)(ii) [1]

(e) The n th term of another sequence D is $\left(-\frac{1}{2}\right)^{n-1}$.

Complete the table for the first four terms of sequence D.

Sequence	1st term	2nd term	3rd term	4th term
D				

[3]

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