Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

MATHEMATICS **0580/42**

Paper 4 (Extended) **October/November 2015**

2 hours 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Tracing paper (optional)
Geometrical instruments

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
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.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
Electronic calculators should 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 in degrees to one decimal place.
For π, use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 130.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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CAMBRIDGE International Examinations

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.

View solution

Answer(a)(i)

[2]

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

View solution

Answer(a)(ii) ..... [1]

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

View solution

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.

View solution

Calculate the smallest possible number of groups.

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

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

View solution

(i) Write this number in figures.

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

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

View solution

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

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

View solution

Calculate the percentage profit.

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

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

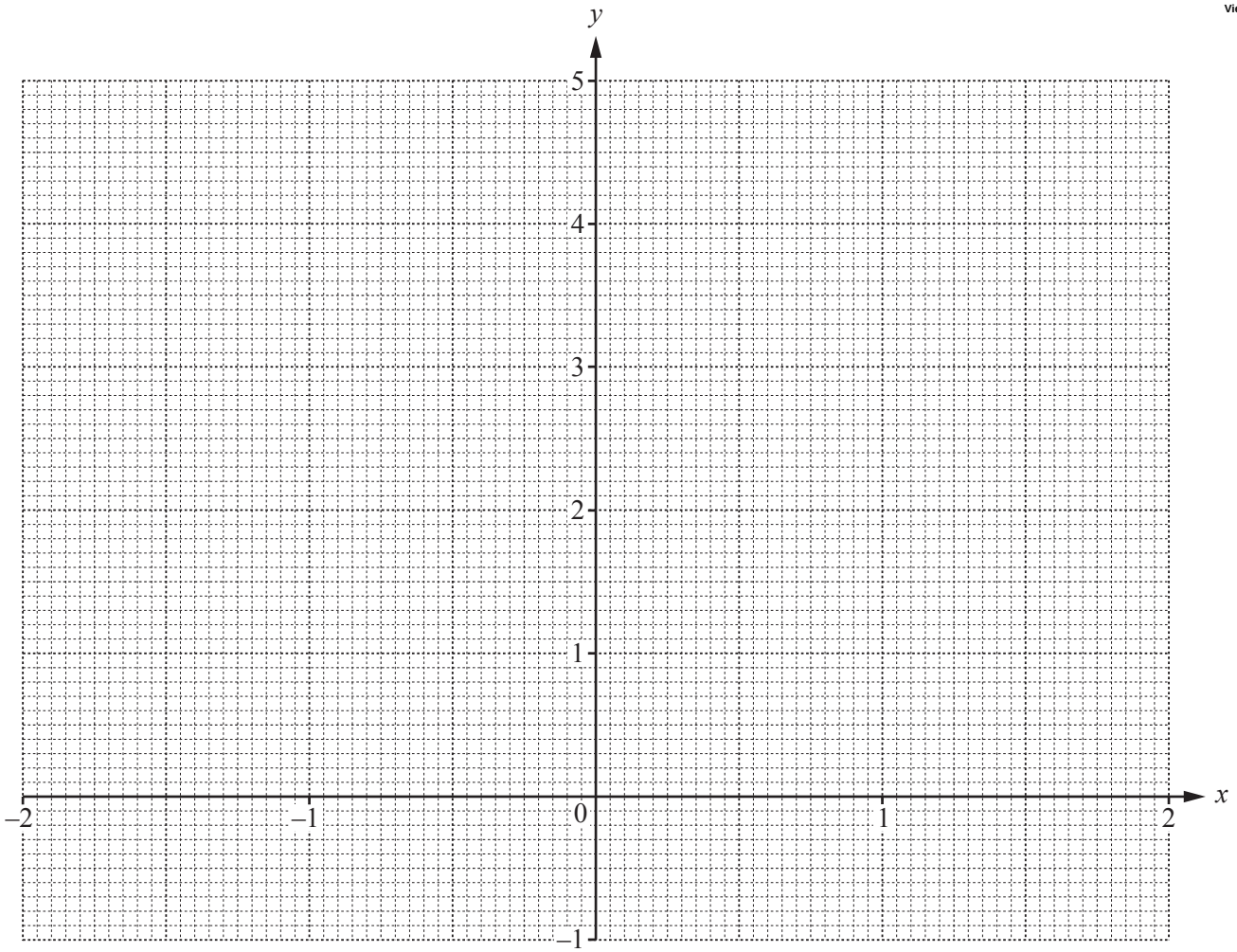
x	–2	–1.5	–1	–0.5	0	0.5	1	1.5	2
y		3.125		3.375	2		0		4

View solution

(a) Complete the table of values. [4]

View solution

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



[4]

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

View solution

Answer(c) $x =$ ..... or $x =$ ..... [3]

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

View solution

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

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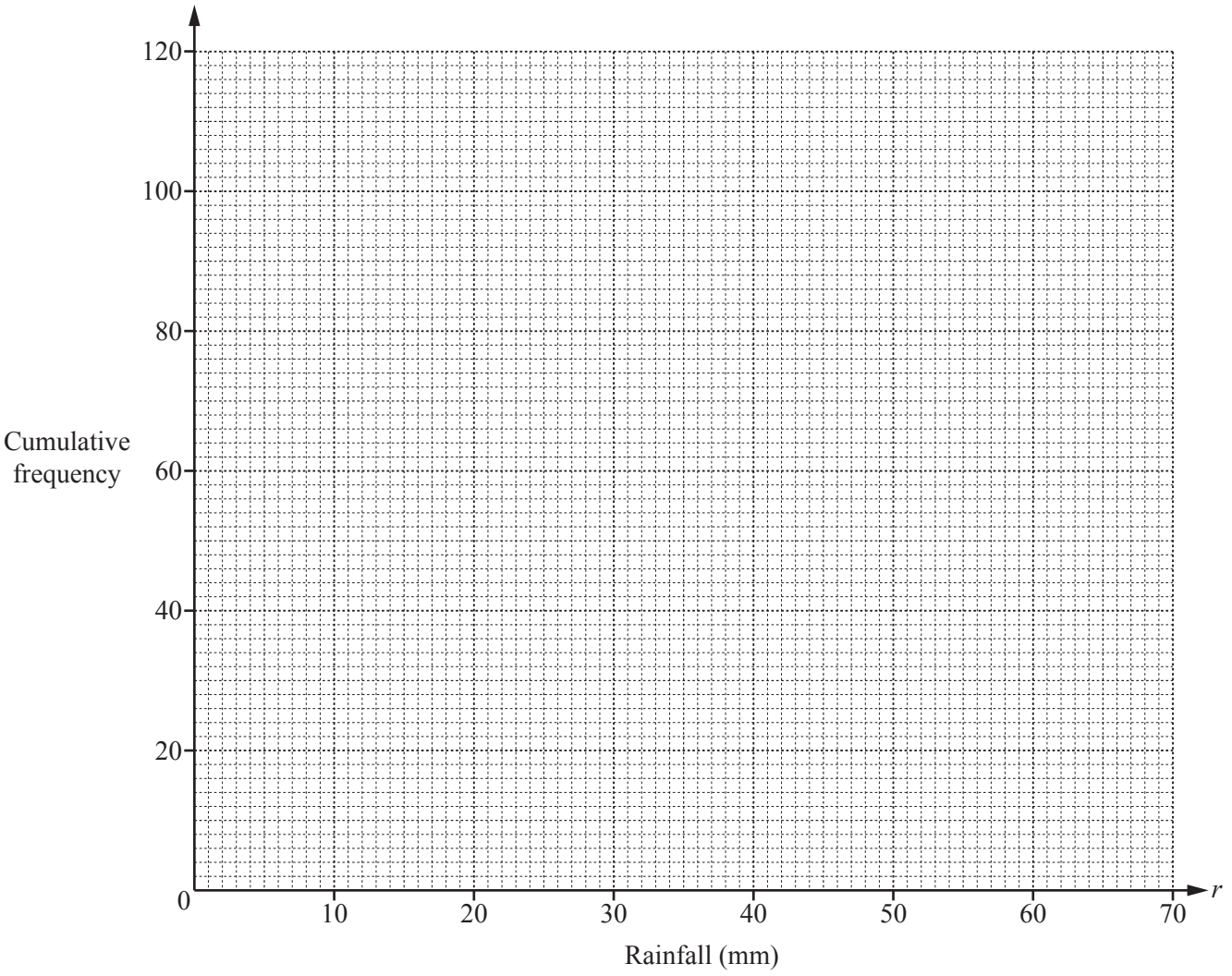
3 Leo measured the rainfall each day, in millimetres, for 120 days.
The cumulative frequency table shows the results.

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

View solution

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



[3]

(b) **(i)** Find the median.

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

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

View solution

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

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

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

[2]

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

View solution

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 $25 < r \leqslant 35$ is 5.9 .

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

View solution

Answer(e) $20 < r \leqslant 25$ .....

$40 < r \leqslant 60$ .....

$60 < r \leqslant 70$ ..... [4]

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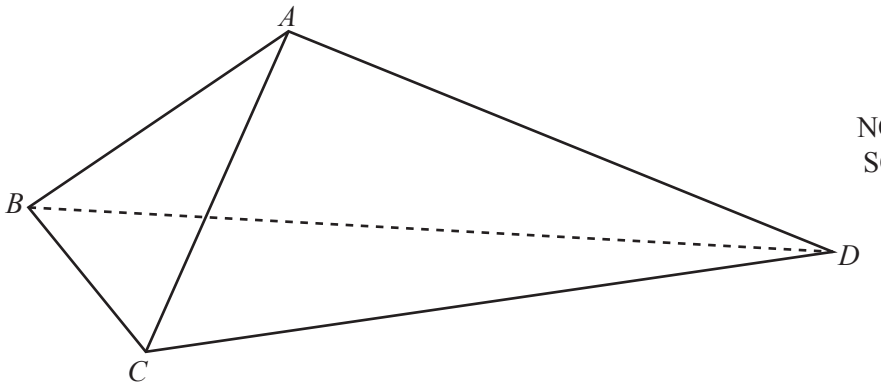
4



NOT TO SCALE

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°.

View solution

Find *AC*.

Answer(a) *AC* = ... m [3]

(b) *CD* = 2.3 m and *AD* = 1.9 m.

View solution

Find angle *ADC*.

Answer(b) Angle *ADC* = ... [4]

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(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.

View solution

Answer(c) .....m^2 [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.

View solution

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

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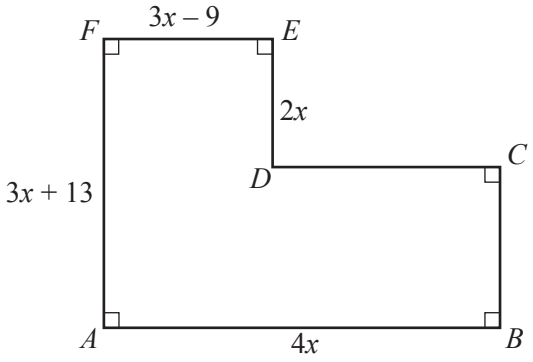
5 **(a)** The area of shape *ABCDEF* is 24 cm^2.
All lengths are in centimetres.

View solution



NOT TO SCALE

(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.

View solution

Answer(a)(ii) x = ... or x = ... [3]

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

View solution

$$3x - 2y = 23$$
$$-4x - y = -5$$

Answer(b) $x =$ .....

$y =$ ..... [3]

(c) Solve the equation.

View solution

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

Answer(c) $t =$ ..... [5]

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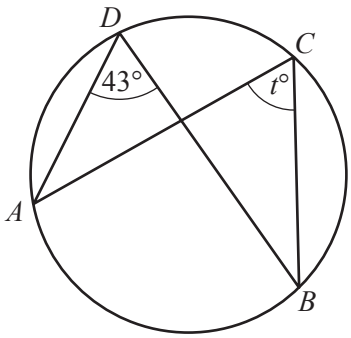
6 **(a)** **(i)** A, B, C and D lie on the circumference of the circle.

View solution



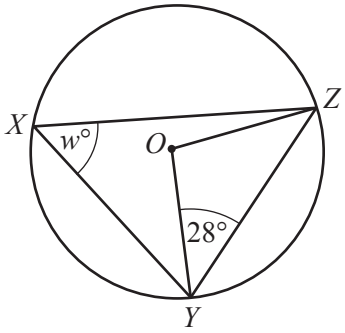
NOT TO SCALE

Find the value of t.

Answer(a)(i) t = ... [1]

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

View solution



NOT TO SCALE

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

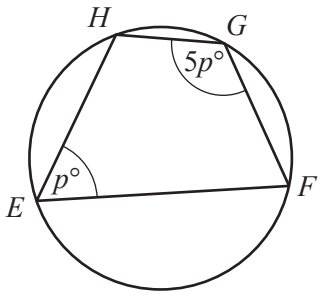
Answer(a)(ii) w = ... because .....

.....

..... [3]

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

View solution



NOT TO SCALE

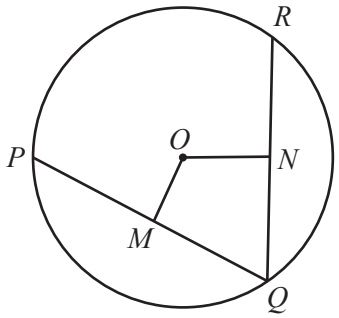
Find the value of p, giving a reason for your answer.

Answer(a)(iii) p = ... because .....

..... [3]

(b)

View solution



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.

$PM : PQ$ = ... : ..... [1]

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

View solution

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

..... is a common side.

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

..... = ... because equal chords are equidistant from .....

[4]

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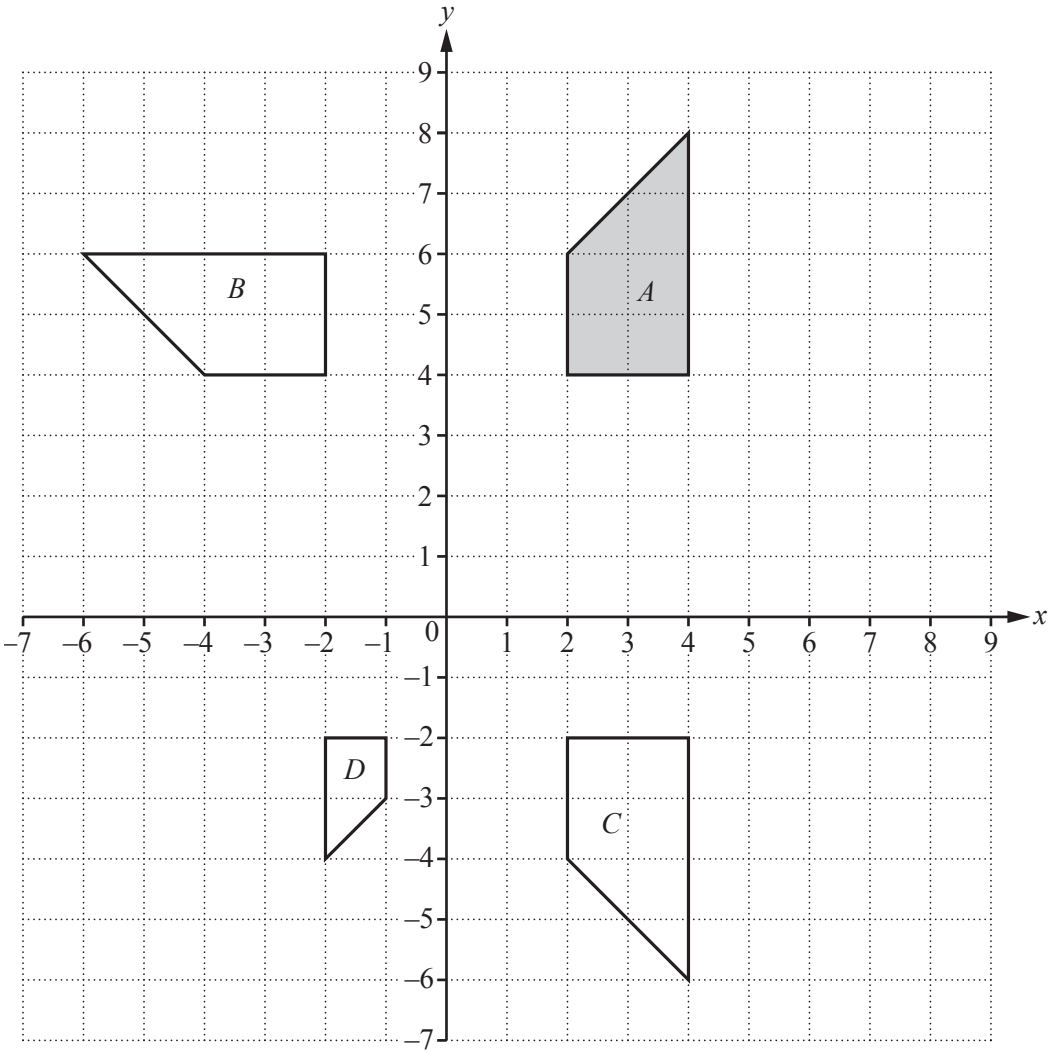
7



(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)**.

View solution

Answer(b) $\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

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

View solution [2]

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

View solution

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.

View solution

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

(b) Calculate the distance AB.

View solution

Answer(b) AB = ... [3]

(c) Find the equation of the line AB.

View solution

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

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

Find the value of r.

View solution

Answer(d) r = ... [3]

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9 $f(x) = 2x + 5$ $g(x) = 2^x$ $h(x) = 7 - 3x$

View solution

(a) Find

(i) f(3),

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

View solution

(ii) gg(3).

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

View solution

(b) Find $f^{-1}(x)$.

Answer(b) $f^{-1}(x) =$ ..... [2]

View solution

(c) Find fh(x), giving your answer in its simplest form.

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

View solution

(d) Find the integer values of x which satisfy this inequality.

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

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

Question 10 is printed on the next page.

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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	

View solution

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

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

View solution

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

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

View solution

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

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

View solution

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

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

View solution

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

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

View solution

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

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

View solution

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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