Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

MATHEMATICS **0580/42**

Paper 4 (Extended) **May/June 2019**

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.

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1 **(a)** The price of a newspaper increased from \$0.97 to \$1.13 .

View solution

Calculate the percentage increase.

..... % [3]

(b) One day, the newspaper had 60 pages of news and advertisements.
The ratio number of pages of news : number of pages of advertisements = 5 : 7.

View solution

(i) Calculate the number of pages of advertisements.

..... [2]

(ii) Write the number of pages of advertisements as a percentage of the number of pages of news.

View solution

..... % [1]

(c) On holiday Maria paid 2.25 euros for the newspaper when the exchange rate was \$1 = 0.9416 euros.
At home Maria paid \$1.13 for the newspaper.

View solution

Calculate the difference in price.
Give your answer in dollars, correct to the nearest cent.

\$ ..... [3]

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(d) The number of newspapers sold decreases exponentially by x% each year.
Over a period of 21 years the number of newspapers sold decreases from 1 763 000 to 58 000.

View solution

Calculate the value of x.

$x =$ ..... [3]

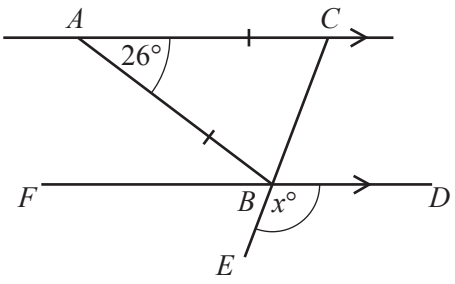
(e) Every page of the newspaper is a rectangle measuring 43 cm by 28 cm, both correct to the nearest centimetre.

View solution

Calculate the upper bound of the area of a page.

..... cm^2 [2]

2 (a)



NOT TO SCALE

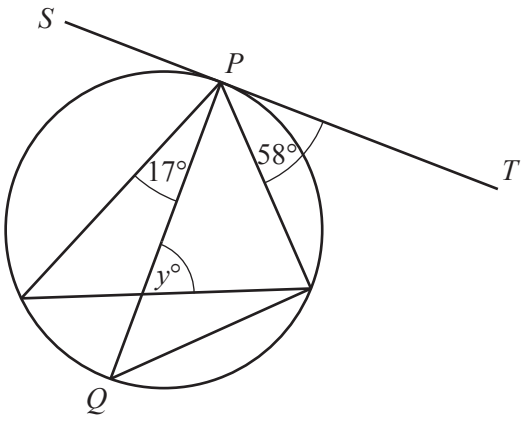
View solution

AC is parallel to *FBD*, *ABC* is an isosceles triangle and *CBE* is a straight line.

Find the value of x.

$x =$ ..... [3]

(b)



NOT TO SCALE

View solution

The diagram shows a circle with diameter *PQ*.
SPT is a tangent to the circle at *P*.

Find the value of y.

$y =$ ..... [5]

3 The probability that Andrei cycles to school is r.

(a) Write down, in terms of r, the probability that Andrei **does not** cycle to school.

View solution

..... [1]

(b) The probability that Benoit **does not** cycle to school is $1.3 - r$.
The probability that both Andrei and Benoit **do not** cycle to school is 0.4 .

View solution

(i) Complete the equation in terms of r.

(.....) × (.....) = 0.4 [1]

(ii) Show that this equation simplifies to $10r^2 - 23r + 9 = 0$.

View solution

[3]

(iii) Solve by factorisation $10r^2 - 23r + 9 = 0$.

View solution

r = ... or r = ... [3]

(iv) Find the probability that Benoit **does not** cycle to school.

View solution

..... [1]

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4 **(a)** The equation of a straight line is $2y = 3x + 4$.

View solution

(i) Find the gradient of this line.

..... [1]

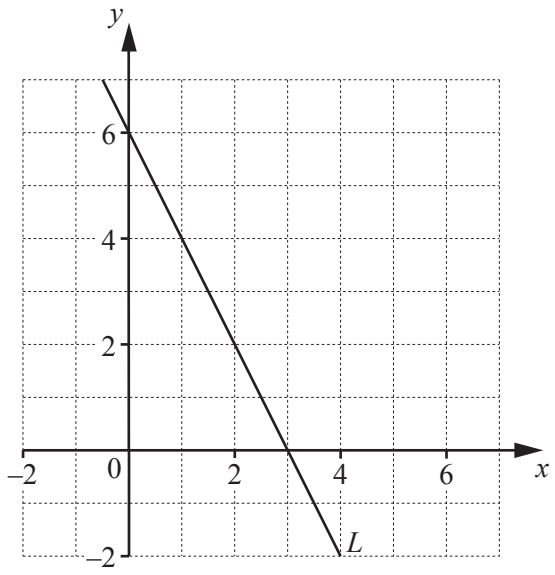
(ii) Find the co-ordinates of the point where the line crosses the y-axis.

View solution

(..... , ...) [1]

(b) The diagram shows a straight line L.

View solution



(i) Find the equation of line L.

..... [3]

(ii) Find the equation of the line perpendicular to line L that passes through (9, 3).

View solution

..... [3]

(c) A is the point $(8, 5)$ and B is the point $(-4, 1)$.

View solution

(i) Calculate the length of AB.

..... [3]

(ii) Find the co-ordinates of the midpoint of AB.

View solution

(..... , ...) [2]

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5 The table shows some values of $y = \frac{1}{2x} - \frac{x}{4}$ for $0.15 \leqslant x \leqslant 3.5$.

x	0.15	0.2	0.5	1	1.5	2	2.5	3	3.5
y	3.30		0.88		−0.04		−0.43	−0.58	−0.73

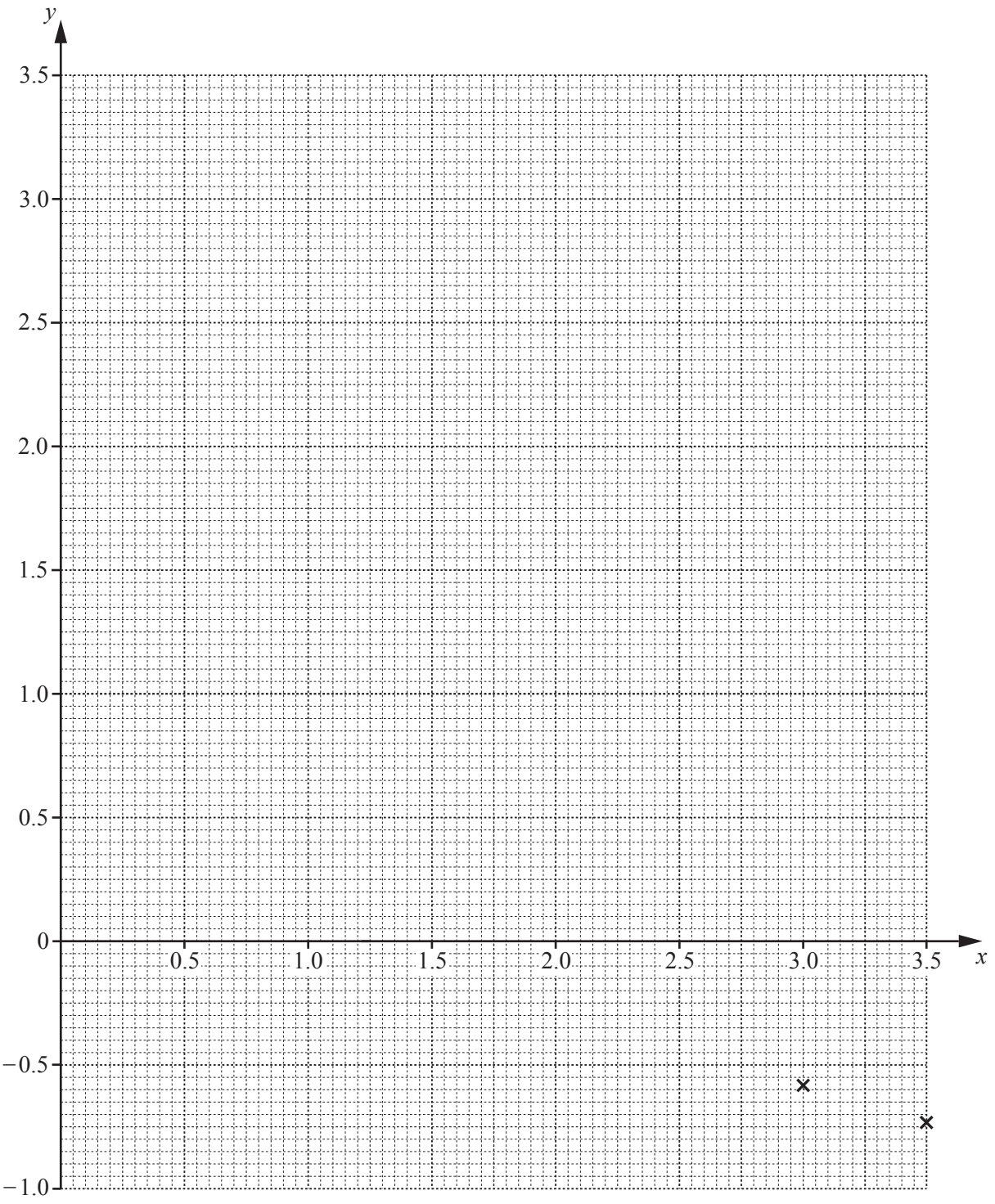
View solution

(a) Complete the table. [3]

View solution

(b) On the grid, draw the graph of $y = \frac{1}{2x} - \frac{x}{4}$ for $0.15 \leqslant x \leqslant 3.5$.

The last two points have been plotted for you.



[4]

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(c) Use your graph to solve the equation $\frac{1}{2x} - \frac{x}{4} = \frac{1}{2}$ for $0.15 \leqslant x \leqslant 3.5$.

View solution

$x =$ ..... [1]

(d) **(i)** On the grid, draw the line $y = 2 - x$. [2]

(ii) Write down the x co-ordinates of the points where the line $y = 2 - x$ crosses the graph of $y = \frac{1}{2x} - \frac{x}{4}$ for $0.15 \leqslant x \leqslant 3.5$.

View solution

$x =$ ..... and $x =$ ..... [2]

(e) Show that the graph of $y = \frac{1}{2x} - \frac{x}{4}$ can be used to find the value of $\sqrt{2}$ for $0.15 \leqslant x \leqslant 3.5$.

View solution

[2]

6 **(a)** Expand and simplify.

$$(x+7)(x-3)$$

View solution

..... [2]

(b) Factorise completely.

View solution

(i) $15p^2q^2 - 25q^3$

..... [2]

(ii) $4fg + 6gh + 10fk + 15hk$

View solution

..... [2]

(iii) $81k^2 - m^2$

View solution

..... [2]

(c) Solve the equation.

$$3(x-4) + \frac{x+2}{5} = 6$$

View solution

$x =$ ..... [4]

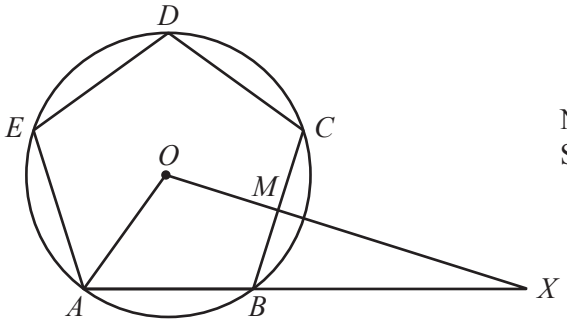
7 **(a)** Show that each interior angle of a regular pentagon is 108°.

View solution

[2]

View solution

(b)



NOT TO SCALE

The diagram shows a regular pentagon $ABCDE$.
The vertices of the pentagon lie on a circle, centre O, radius 12 cm.
M is the midpoint of BC.

(i) Find BM.

$BM =$ ..... cm [3]

View solution

(ii) OMX and ABX are straight lines.

(a) Find BX.

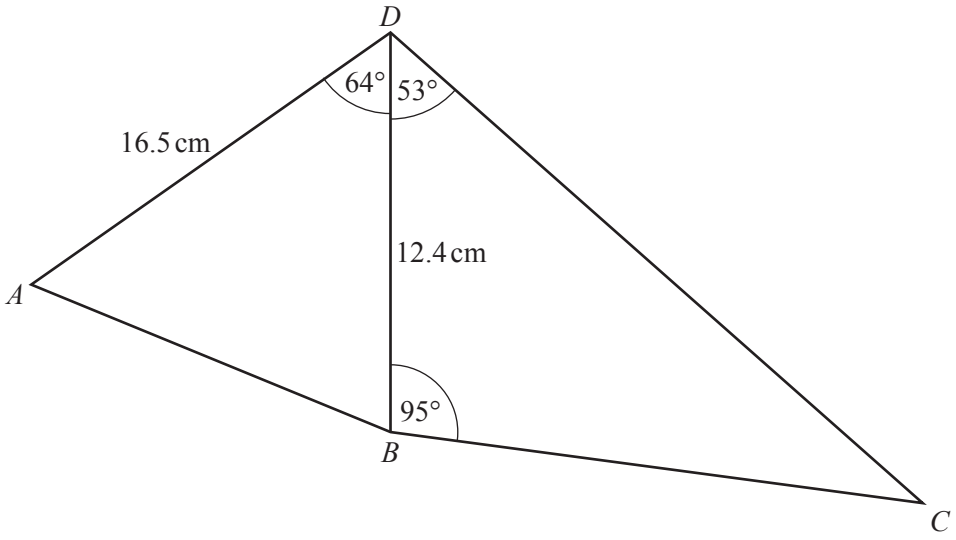
$BX =$ ..... cm [3]

(b) Calculate the area of triangle AOX.

..... cm^2 [3]

8 (a)

View solution



NOT TO SCALE

The diagram shows two triangles ABD and BCD.
$AD = 16.5$ cm and $BD = 12.4$ cm.
Angle $ADB = 64°$, angle $BDC = 53°$ and angle $DBC = 95°$.

(i) Find AB.

$AB =$ ..... cm [4]

(ii) Find BC.

View solution

$BC =$ ..... cm [4]

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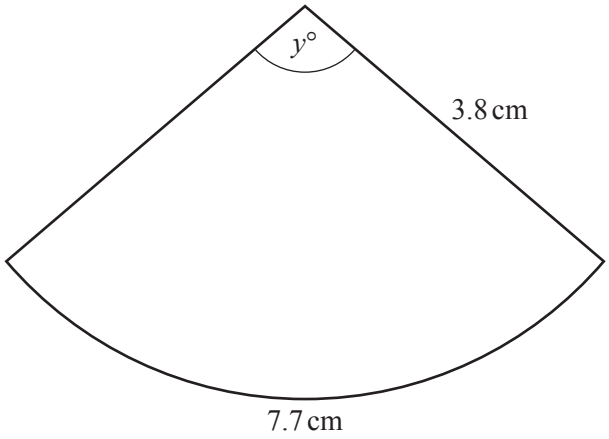
(b)

View solution



NOT TO SCALE

The diagram shows a sector of a circle of radius 3.8 cm.
The arc length is 7.7 cm.

(i) Calculate the value of y.

$y =$ ..... [2]

(ii) Calculate the area of the sector.

View solution

..... cm^2 [2]

9 100 students were each asked how much money, \$$m$, they spent in one week.
The frequency table shows the results.

Amount (\$$m$)	$0 < m \leqslant 5$	$5 < m \leqslant 10$	$10 < m \leqslant 20$	$20 < m \leqslant 30$	$30 < m \leqslant 50$
Frequency	16	38	30	9	7

(a) Calculate an estimate of the mean.

View solution

\$ ..... [4]

(b) Complete the cumulative frequency table below.

View solution

Amount (\$$m$)	$m \leqslant 5$	$m \leqslant 10$	$m \leqslant 20$	$m \leqslant 30$	$m \leqslant 50$
Cumulative frequency	16				100

[2]

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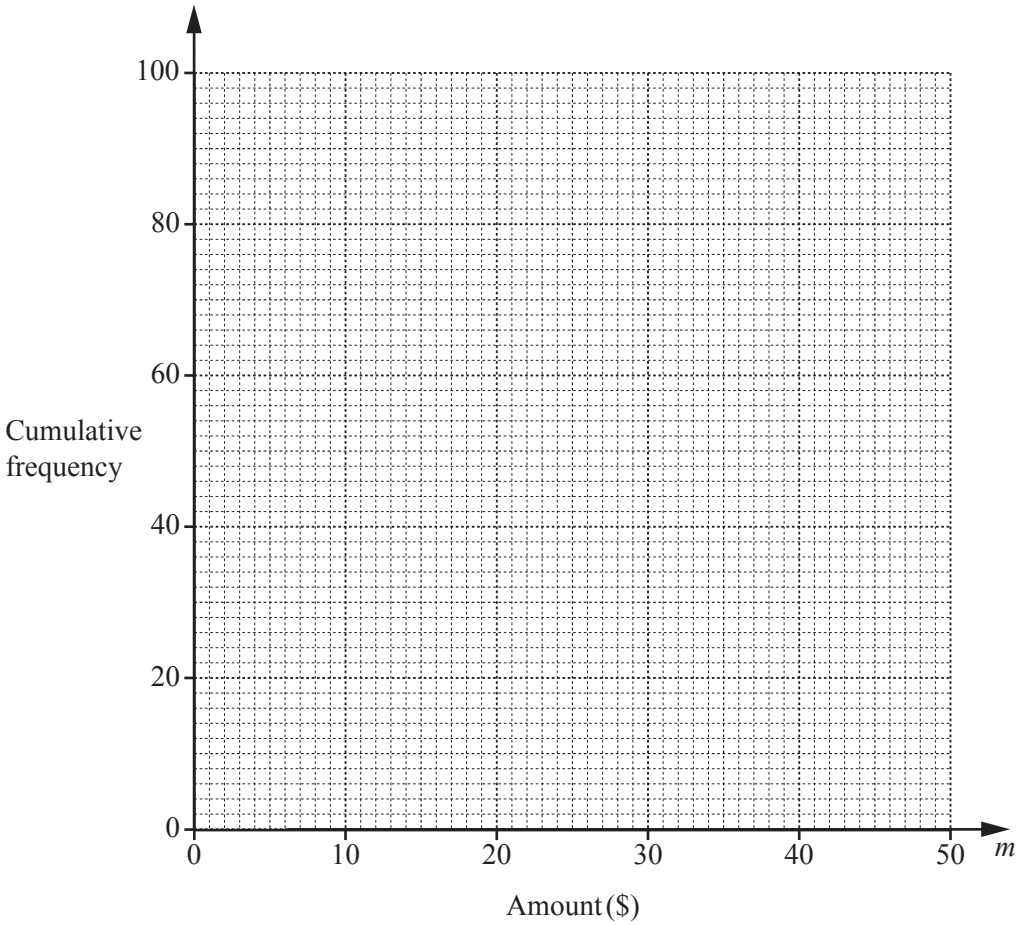
(c) On the grid, draw the cumulative frequency diagram.

View solution



[3]

(d) Use your cumulative frequency diagram to find an estimate for

View solution

(i) the median,

$ ..... [1]

(ii) the interquartile range,

View solution

$ ..... [2]

(iii) the number of students who spent more than $25.

..... [2]

View solution

10 **(a)** The volume of a solid metal sphere is $24\,430\,\text{cm}^3$.

View solution

(i) Calculate the radius of the sphere.

[The volume, V, of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

..... cm [3]

View solution

(ii) The metal sphere is placed in an empty tank.
The tank is a cylinder with radius 50 cm, standing on its circular base.
Water is poured into the tank to a depth of 60 cm.

Calculate the number of litres of water needed.

..... litres [3]

View solution

(b) A different tank is a cuboid measuring 1.8 m by 1.5 m by 1.2 m.
Water flows from a pipe into this empty tank at a rate of $200\,\text{cm}^3$ per second.

Find the time it takes to fill the tank.
Give your answer in hours and minutes.

..... hours ..... minutes [4]

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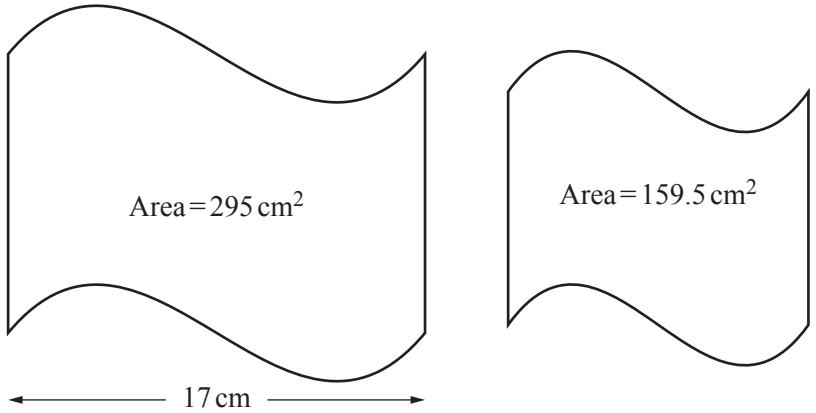
(c)

View solution



NOT TO SCALE

The diagram shows two mathematically similar shapes with areas 295 cm^2 and 159.5 cm^2.
The width of the larger shape is 17 cm.

Calculate the width of the smaller shape.

..... cm [3]

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11

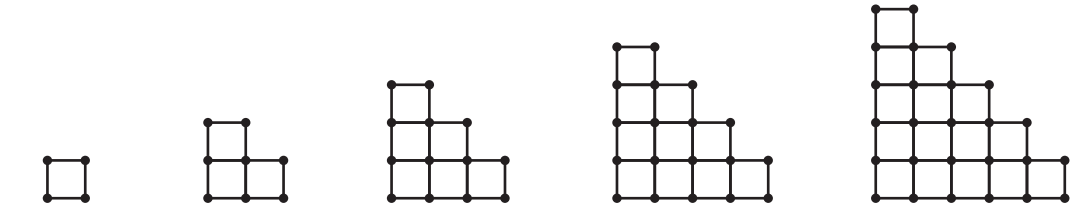

Diagram 1 Diagram 2 Diagram 3 Diagram 4 Diagram 5

The sequence of diagrams above is made up of small lines and dots.

(a) Complete the table.

View solution

	Diagram 1	Diagram 2	Diagram 3	Diagram 4	Diagram 5	Diagram 6
Number of small lines	4	10	18	28		
Number of dots	4	8	13	19		

[4]

(b) For Diagram n find an expression, in terms of n, for the number of small lines.

View solution

..... [2]

(c) Diagram r has 10 300 small lines.

View solution

Find the value of r.

$r =$ ..... [2]

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(d) The number of dots in Diagram n is $an^2 + bn + 1$.

Find the value of a and the value of b.

View solution

$a =$ .....

$b =$ ..... [2]

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