



1 Margarita keeps a record of all her marks for science experiments, as shown in the table below.

Mark	5	6	7	8	9	10
Frequency	1	5	10	9	7	3

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(a) (i) How many science experiments did Margarita do?

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

(ii) Write down the mode.

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

(iii) Find the median.

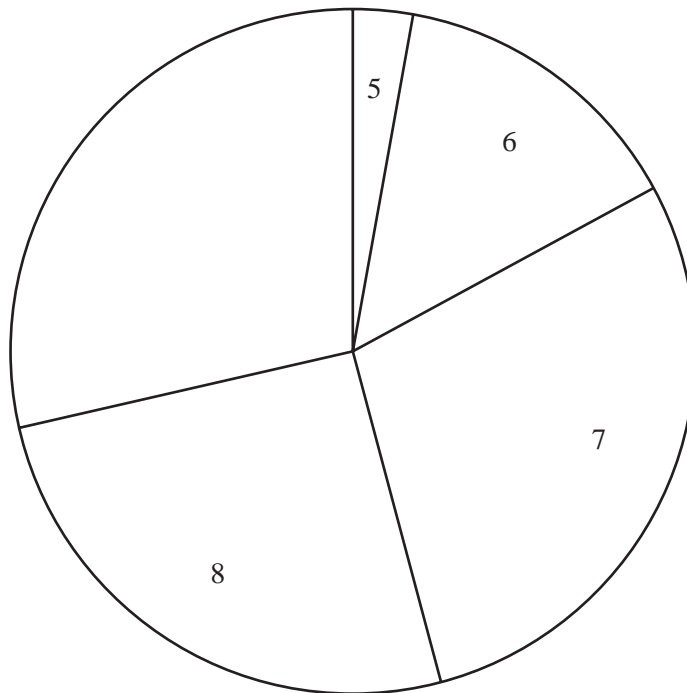
Answer(a)(iii) ..... [1]

(iv) Calculate the mean.

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

(b) Margarita draws a pie chart to show this information.

The sectors for her marks of 5, 6, 7 and 8 have already been drawn.

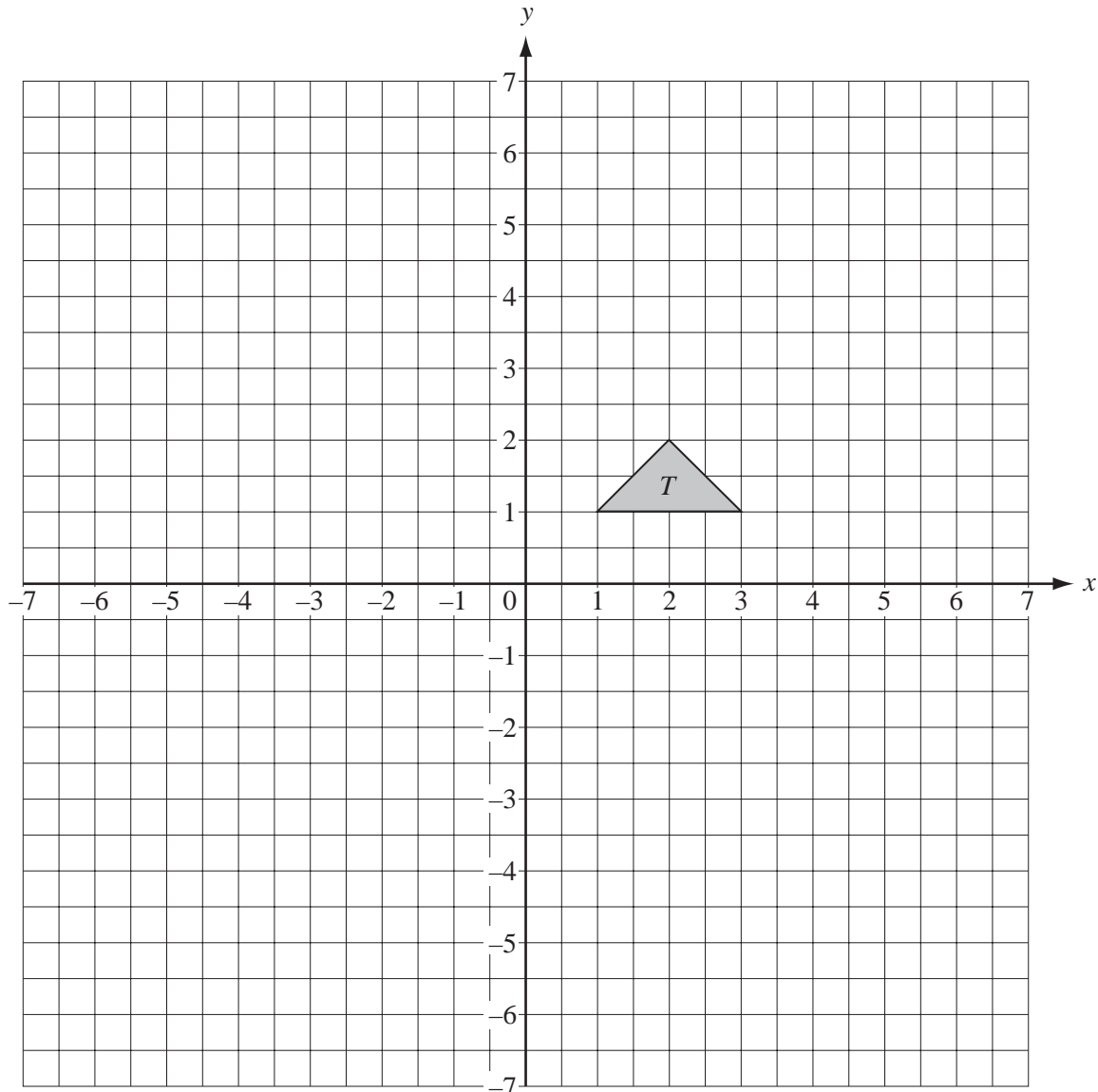


(i) Calculate the angle of the sector for her mark of 9.

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

(ii) Complete the pie chart accurately.

[1]



- (a) Draw the image of triangle  $T$  after translation by the vector  $\begin{pmatrix} -6 \\ 3 \end{pmatrix}$ . Label it  $A$ . [2]
- (b) Draw the image of triangle  $T$  after reflection in the line  $y = -1$ . Label it  $B$ . [2]
- (c) Draw the image of triangle  $T$  after rotation through  $180^\circ$  about the point  $(0, 0)$ . Label it  $C$ . [2]
- (d) Draw the image of triangle  $T$  after enlargement, centre  $(0, 0)$ , scale factor 2. Label it  $D$ . [2]
- (e) Describe clearly the **single** transformation which maps triangle  $D$  onto triangle  $T$ .

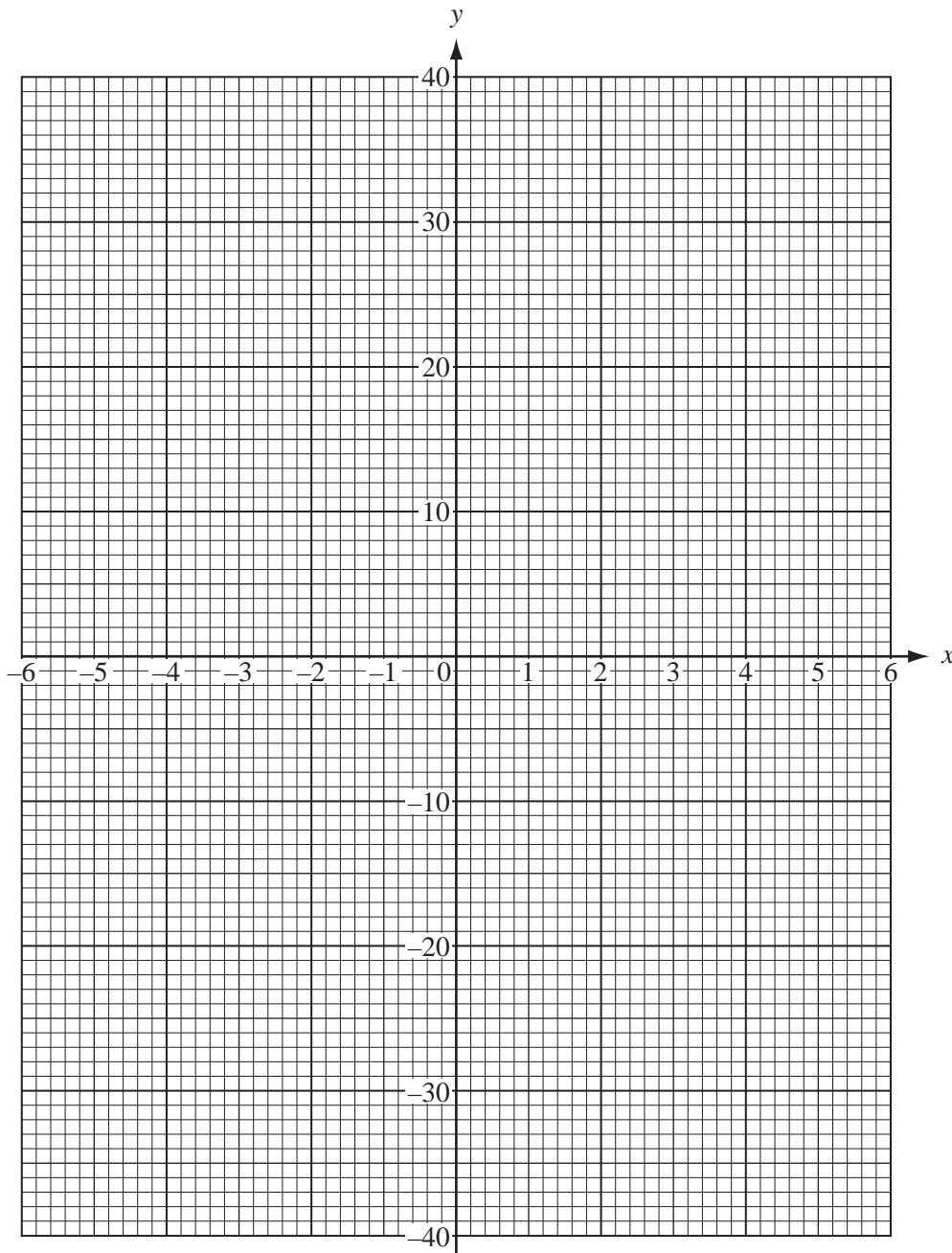
Answer(e) ..... [3]

- 3 (a) Complete the table for the function  $y = \frac{36}{x}$ , ( $x \neq 0$ ).

$x$	-6	-5	-4	-3	-2	-1		1	2	3	4	5	6
$y$		-7.2	-9		-18				18		9	7.2	

[3]

- (b) On the grid below, draw the graph of  $y = \frac{36}{x}$  for  $-6 \leq x \leq -1$  and  $1 \leq x \leq 6$ .



[4]

- (c) Use your graph to find  $x$  when  $y = 21$ .

Answer(c)  $x =$  ..... [1]

(d) Complete the table for the function  $y = x^2$ .

$x$	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
$y$		25	16		4	1		1	4		16	25	

[2]

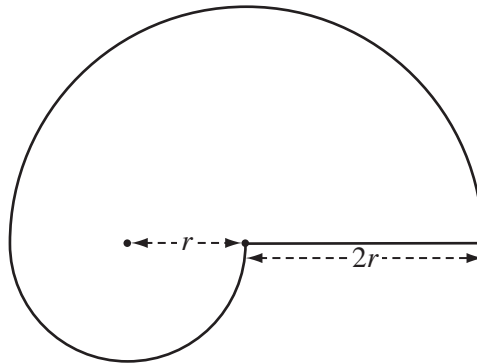
(e) On the same grid, draw the graph of  $y = x^2$  for  $-6 \leq x \leq 6$ .

[4]

(f) Write down the co-ordinates of the point of intersection of the graphs of  $y = \frac{36}{x}$  and  $y = x^2$ .

Answer(f) ( ..... , ..... ) [1]

4



The area of the shape is given by the formula  $A = \frac{5\pi r^2}{2}$ .

(a) Calculate the area when  $r = 3$  cm.

Answer(a)  $A =$  .....  $\text{cm}^2$  [2]

(b) Calculate the value of  $r$  when  $A = 200 \text{ cm}^2$ .

Answer(b)  $r =$  .....  $\text{cm}$  [3]

(c) Make  $r$  the subject of the formula.

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

5 (a)  $-4$   $-16$   $0.12$   $7$   $144$   $\sqrt{7}$   $2\frac{2}{3}$

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From this list of numbers, write down

(i) the smallest number,

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

(ii) a natural number,

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

(iii) a square number,

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

(iv) an irrational number.

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

(b) Write down 40 as a **product** of prime numbers.  
(1 is not a prime number.)

Answer(b)  $40 =$  ..... [2]

(c) Three pairs of prime numbers have a **sum** of 40.

One pair is 3 and 37.

Find the other two pairs.

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

6 (a) Pencils cost 5 cents each and erasers cost 4 cents each.

(i) Work out the **total** cost of 10 pencils and 7 erasers.

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

(ii) Write down, in terms of  $p$  and  $e$ , the **total** cost of  $p$  pencils and  $e$  erasers.

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

(b) The cost of a pen is  $x$  cents and the cost of a ruler is  $y$  cents.

2 pens and 3 rulers have a total cost of 57 cents.

5 pens and 1 ruler have a total cost of 58 cents.

(i) Write down two equations in  $x$  and  $y$ .

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

(ii) Find the value of  $x$  and the value of  $y$ .

*Answer(b)(ii)*  $x =$  .....  
 $y =$  .....[4]

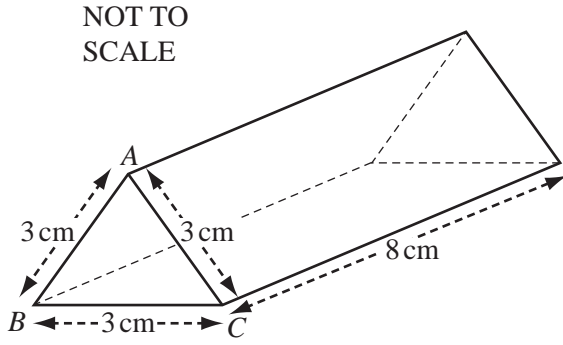


Diagram 1

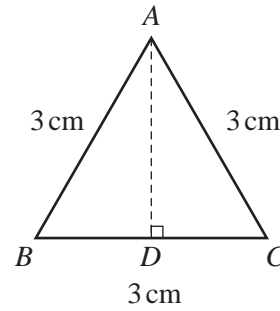


Diagram 2

A physics teacher uses a set of identical triangular glass prisms in a lesson. Diagram 1 shows one of the prisms. Diagram 2 shows the cross-section of one prism. The triangle  $ABC$  is equilateral, with sides of length 3 cm and height  $AD$ .

(a) (i) Calculate the length of  $AD$ .

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

(ii) Calculate the area of triangle  $ABC$ .

Answer(a)(ii) .....  $\text{cm}^2$  [2]

(iii) The length of the prism is 8 cm. Calculate the volume of the prism.

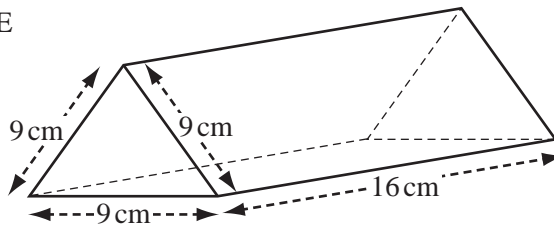
Answer(a)(iii) .....  $\text{cm}^3$  [2]



- (b) After the lesson, the glass prisms are put into a box, which is also a triangular prism. The cross-section is an equilateral triangle, with sides of length 9 cm. The length of the box is 16 cm.

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NOT TO  
SCALE



- (i) Work out the largest number of glass prisms that can fit into the box.

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

- (ii) Sketch a net of the box. (Accurate construction is **not** required.)

[1]

- (iii) Calculate the surface area of the box.

Answer(b)(iii) ..... cm<sup>2</sup> [6]

- (iv) The box was made out of plastic, which cost 6 cents per square centimetre. To make the box, 540 cm<sup>2</sup> of plastic was bought. Calculate the total cost of the plastic, giving your answer in dollars.

Answer(b)(iv) \$ ..... [2]

- 8 Carlos is in a class of 12 students.  
He compares the results of the students in a mathematics test with their results in a history test.  
The table shows these results.

For  
Examiner's  
Use

Student	A	B	C	D	E	F	G	H	I	J	K	L
Mathematics mark	17	8	11	15	14	19	9	12	19	18	13	15
History mark	10	13	10	8	11	7	14	11	10	11	11	10

- (a) A student is chosen at random.  
What is the probability that the student scored **more than** 10 marks

(i) in mathematics,

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

(ii) in mathematics and in history,

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

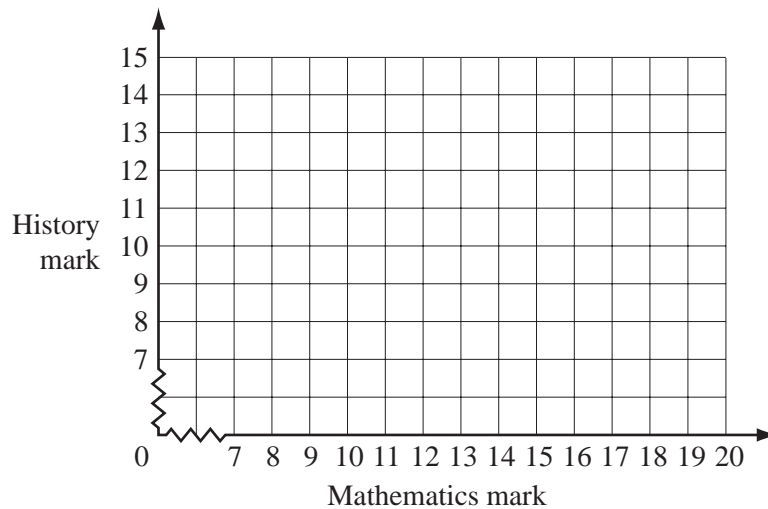
(iii) in at least one subject?

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

- (b) The mean mathematics mark is 14.2.  
Calculate the mean history mark.

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

(c)

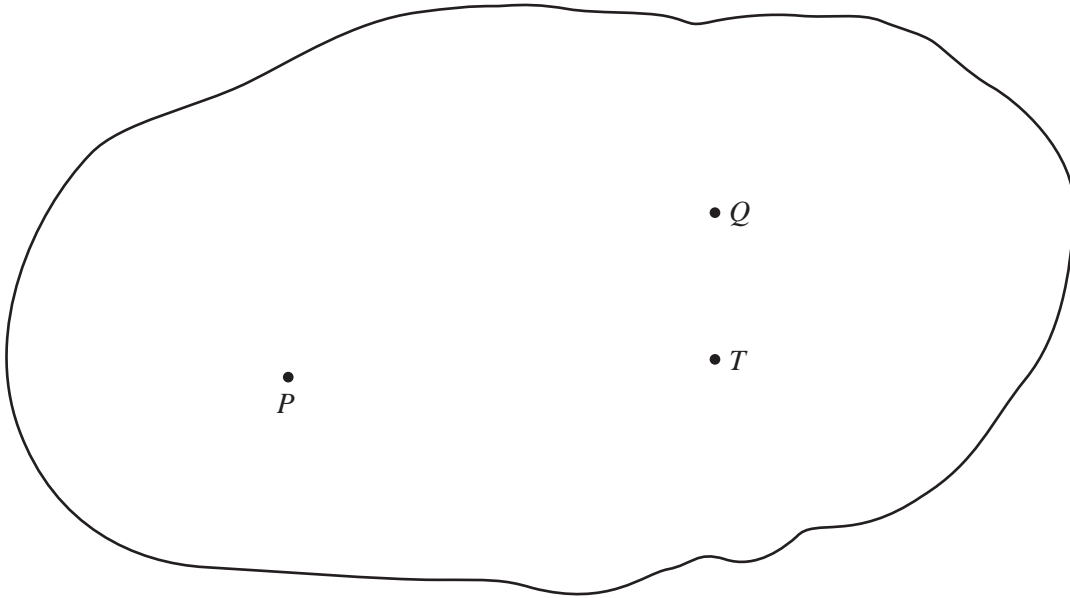


(i) On the grid, plot the points to show the results of the 12 students. [3]

(ii) Draw a line of best fit. [1]

(iii) What type of correlation does this show?

Answer(c)(iii) ..... [1]



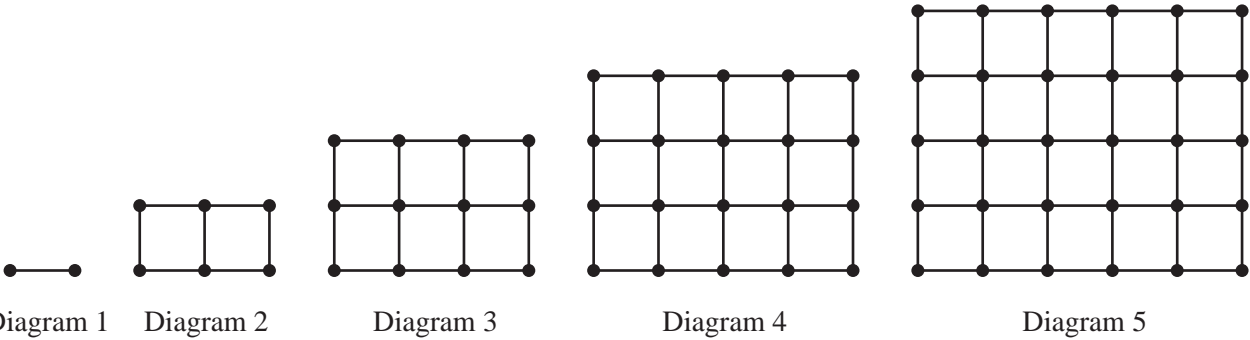
The scale drawing shows a map of a town.  
The positions of the town hall,  $T$ , and two post offices,  $P$  and  $Q$ , are marked.  
On the scale drawing, 1 centimetre represents 200 metres.

- (a) A new post office in the town is to be built so that it is 800 m from  $T$  **and** equidistant from  $P$  and from  $Q$ .
  - (i) On the scale drawing, draw the locus of points which are 800 m from  $T$ . [1]
  - (ii) On the scale drawing, using a straight edge and compasses only, construct the locus of points which are equidistant from  $P$  and from  $Q$ . [2]
  - (iii) Label the position of the new post office  $R$ . [1]
  - (iv) Find the actual distance between post offices  $P$  and  $R$ .

*Answer(a)(iv)* ..... m [2]

- (b) On the scale drawing, draw straight lines to make triangle  $PQT$ .  
Using a straight edge and compasses only, construct the locus of points which are equidistant from  $PT$  and from  $QT$ . [2]
- (c) On the scale drawing, shade the region inside triangle  $PQT$ , where points are nearer to  $Q$  than to  $P$  **and** nearer to  $PT$  than to  $QT$ . [2]

**Question 10 is printed on the next page.**



Look at the sequence of five diagrams above.  
Diagram 1 has 2 dots and 1 line.  
Diagram 2 has 6 dots and 7 lines.

The numbers of dots and lines in each of the diagrams are shown in the table below.

Diagram number	1	2	3	4	5	6	7
Number of dots	2	6	12	20	30		
Number of lines	1	7	17	31	49		

(a) Fill in the empty spaces in the table for Diagrams 6 and 7. [4]

(b) How many dots are there in Diagram  $n$ ?

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

(c) The number of lines in Diagram  $n$  is  $2n^2 - 1$ .  
Which diagram has 287 lines?

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

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