

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

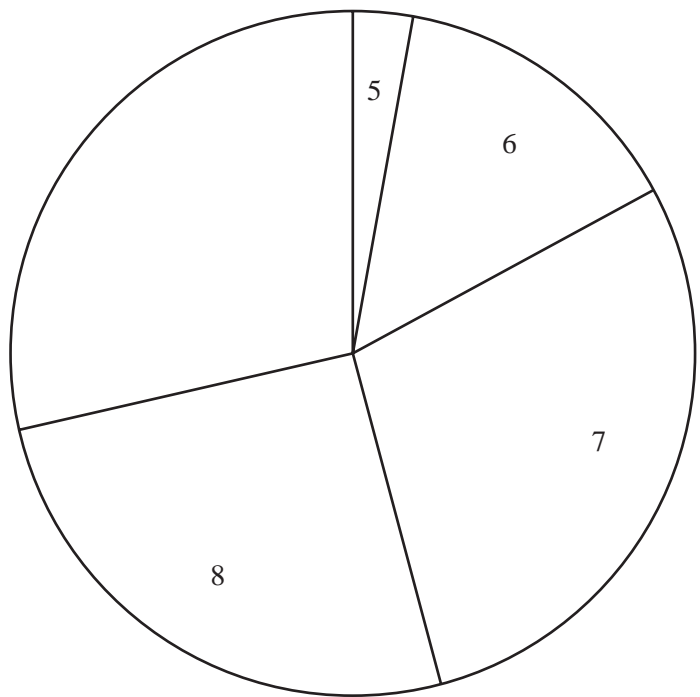
(a) (i) How many science experiments did Margarita do?
Answer(a)(i) [1]

(ii) Write down the mode.
Answer(a)(ii) [1]

(iii) Find the median.
Answer(a)(iii) [1]

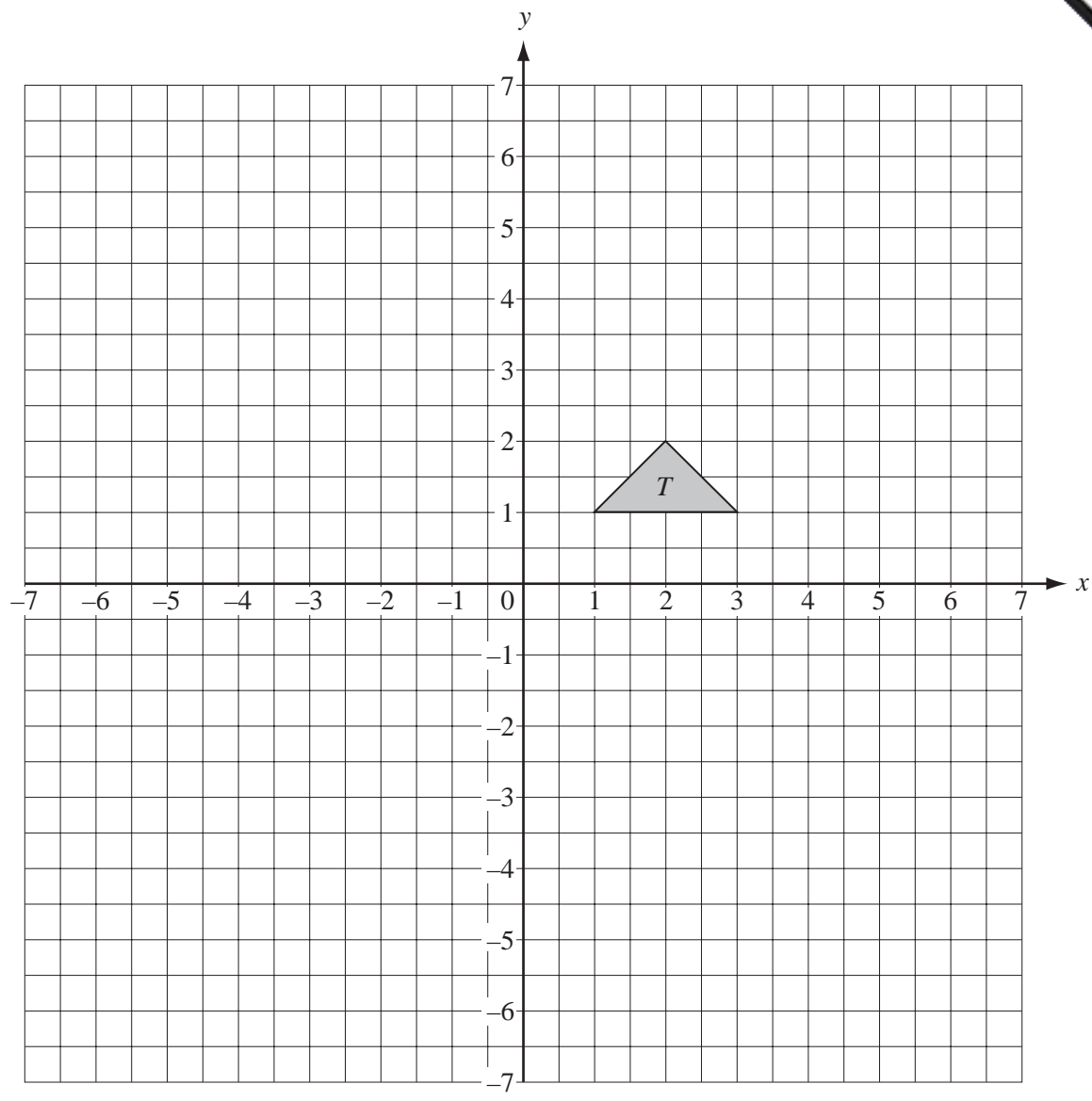
(iv) Calculate the mean.
Answer(a)(iv) [3]

(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° 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 .

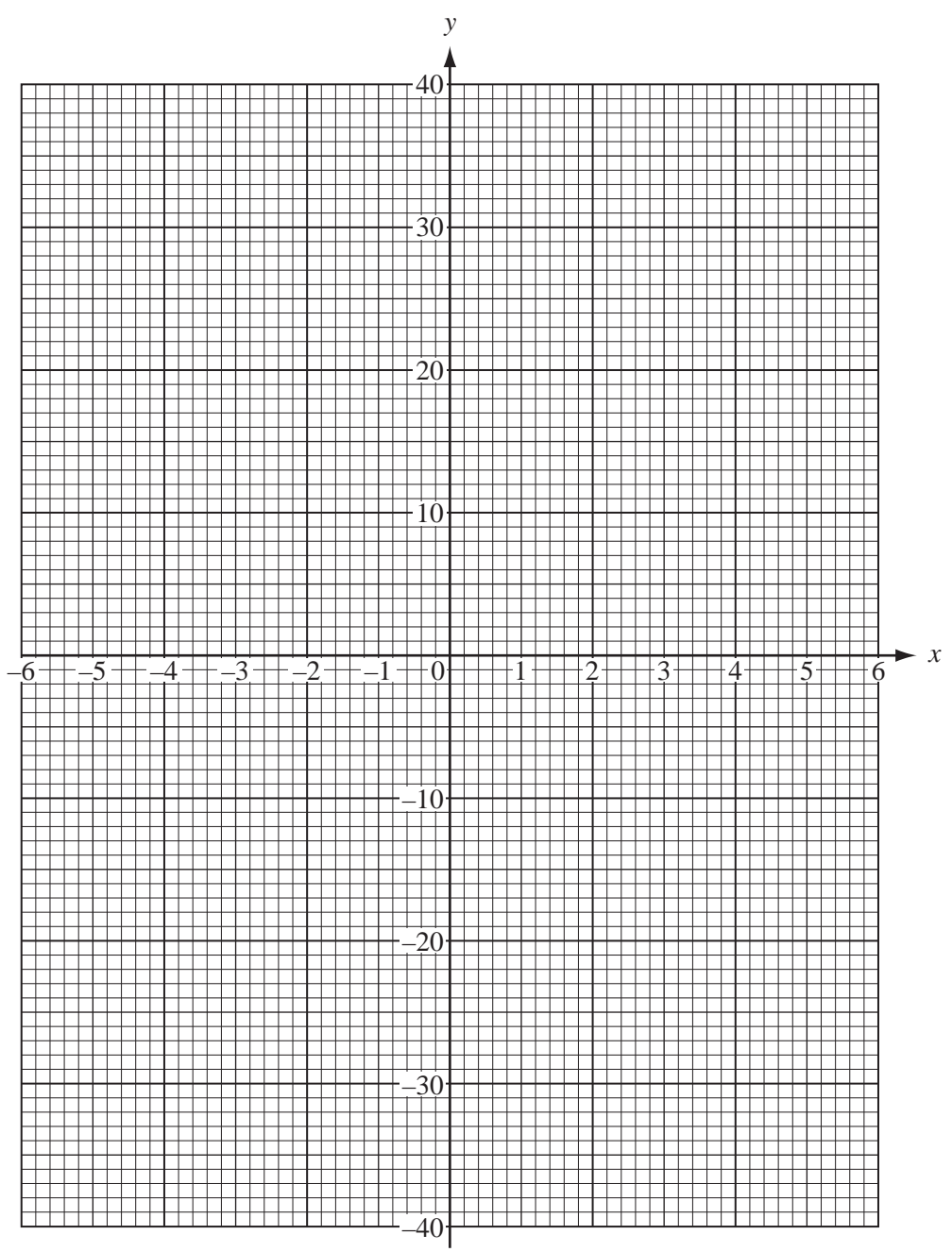
Answer(e) [3]

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]

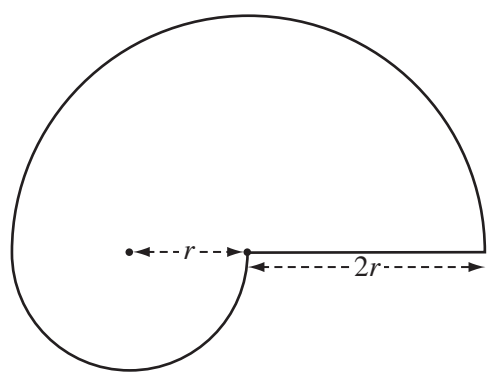
(e) On the same grid, draw the graph of $y = x^2$ for $-6 \leq x \leq 6$.

[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) $A =$ cm^2 [2]

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

Answer(b) $r =$ cm [3]

(c) Make r the subject of the formula.

Answer(c) [3]

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

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]

7

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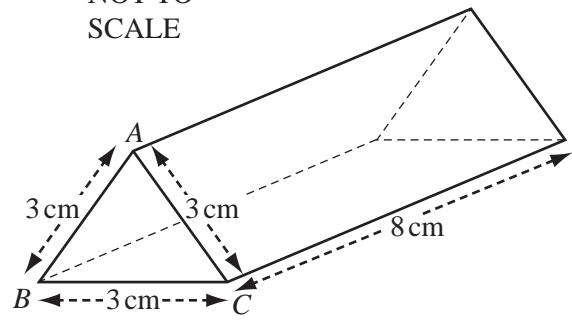


Diagram 1

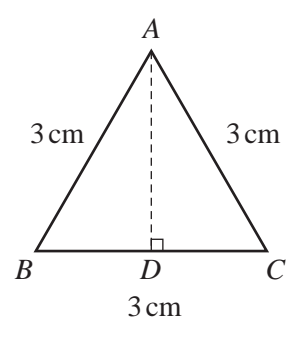


Diagram 2

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 .

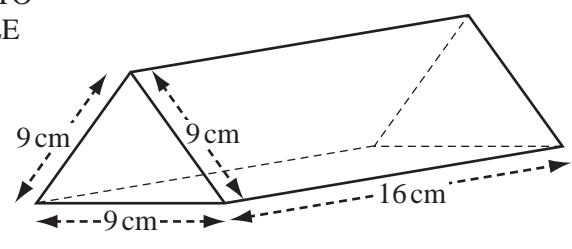
Answer(a)(ii) cm^2 [2]

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

Answer(a)(iii) 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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(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) cm² [6]

(iv) The box was made out of plastic, which cost 6 cents per square centimetre. To make the box, 540 cm² 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.

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]

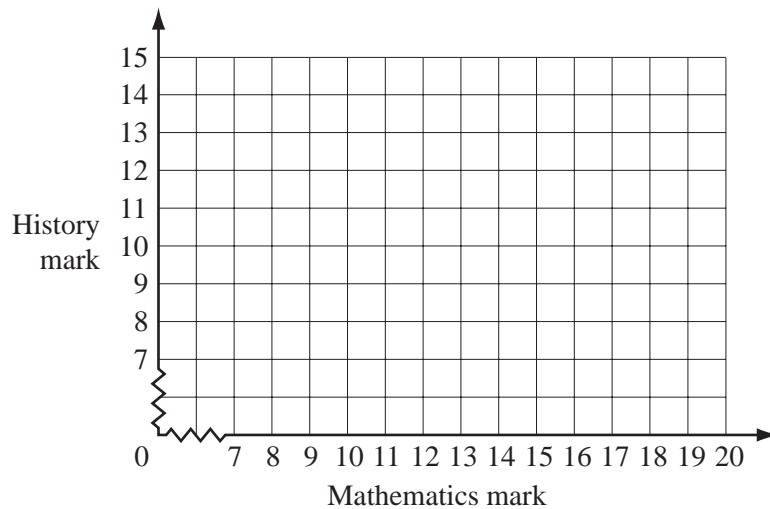
(iii) in at least one subject?

Answer(a)(iii) [1]

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

Answer(b) [2]

(c)

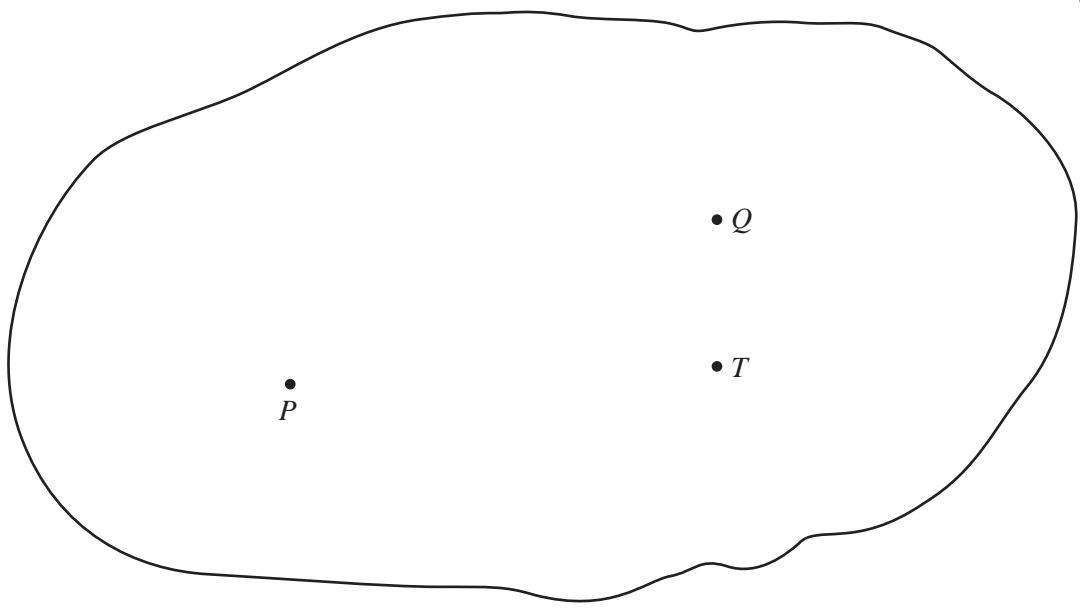


(i) On the grid, plot the points to show the results of the 12 students. [3]

(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.

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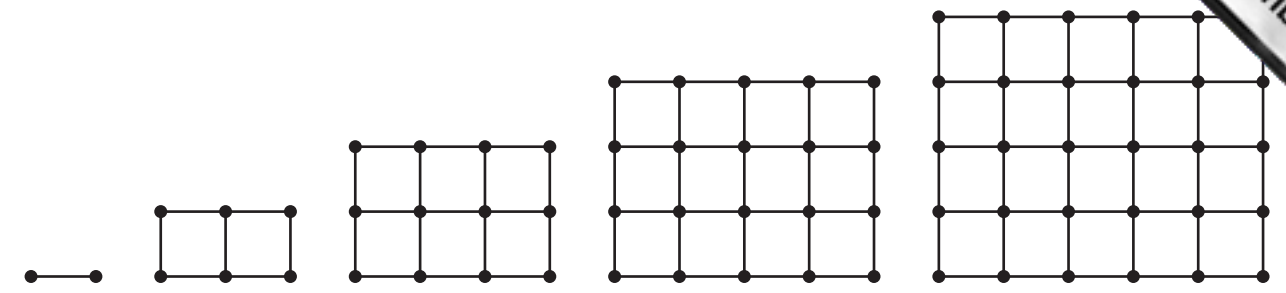


Diagram 1 Diagram 2 Diagram 3 Diagram 4 Diagram 5

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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