



**L-Università
ta' Malta**

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE
EXAMINATIONS BOARD

**SECONDARY EDUCATION CERTIFICATE LEVEL
2025 SUPPLEMENTARY SESSION**

SUBJECT: **Mathematics**
 PAPER NUMBER: I – Level 1-2-3
 DATE: 30th August 2025
 DURATION: 2 hours 5 minutes

Answer **ALL** questions.

Write your answers in the space available on the examination paper.

Show clearly all the necessary steps, explanations and construction lines in your working.

Unless otherwise stated, diagrams are drawn to scale.

The use of non-programmable electronic calculators with statistical functions and mathematical instruments is allowed.

Candidates are allowed to use transparencies for drawing transformations.

This paper carries 100 marks.

	<i>For Office Use Only</i>												
Question Number	1	2	3	4	5	6	7	8	9	10	11	12	13
Mark													

1 Liam is training for a marathon.

(a) On Monday, Liam runs for 1 hour and 55 minutes in the morning and 1 hour and 27 minutes in the evening. How much time does Liam spend running on Monday in total?

(2)

(b) On Tuesday, he starts running at 5:55 am and plans to run for 3 hours and 25 minutes, but he gets tired and stops 40 minutes earlier. At what time does he finish running?

(2)

(c) How much time did he spend running in total on Monday and Tuesday?

(2)

(d) Give your answer of part (c) in seconds.

(2)

(Total: 8 marks)

- 2 (a) (i) Fill in the Carroll diagram below with the following numbers.
The first one has been done for you.

2, 4, 7, 9, 11, 12, 16, 49

	Even	Odd
Prime numbers	2	
Multiples of 6		
Square numbers		

(7)

- (ii) Explain why there cannot be another number apart from 2 which is 'even' and 'prime'.

(1)

- (b) A group of 29 Scouts are going on a camping trip, and they plan to stay in tents that each hold up to 4 people. What is the smallest number of tents needed to make sure everyone has a place to sleep?

(2)

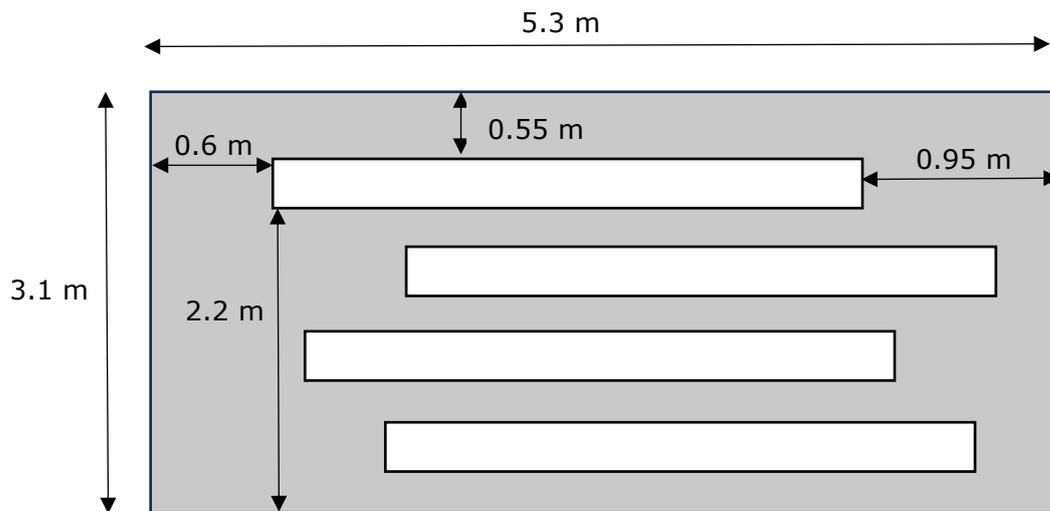
(Total: 10 marks)

- 3 Identify which of the following statements are certain, very likely, very unlikely or impossible to happen.
Put a tick (✓) in the correct box.

	Certain	Very Likely	Very unlikely	Impossible
Multiplying a number by zero equals zero				
Finding a 50 euro note on the pavement				
A car stopping at a red traffic light				
Drawing a triangle with four sides				

(Total: 4 marks)

4 The following shape is a rectangular sheet of metal with 4 identical rectangular holes inside.



(a) Find the area of the large rectangle.

(2)

(b) Using the measurements above, find the length and width of one white rectangular hole.

(2)

(c) Find the area of the metal part.

(4)

(Total: 8 marks)

- 5 In the diagram below, lines AB and CD are parallel.
The line EH intersects AB and CD at F and G respectively.

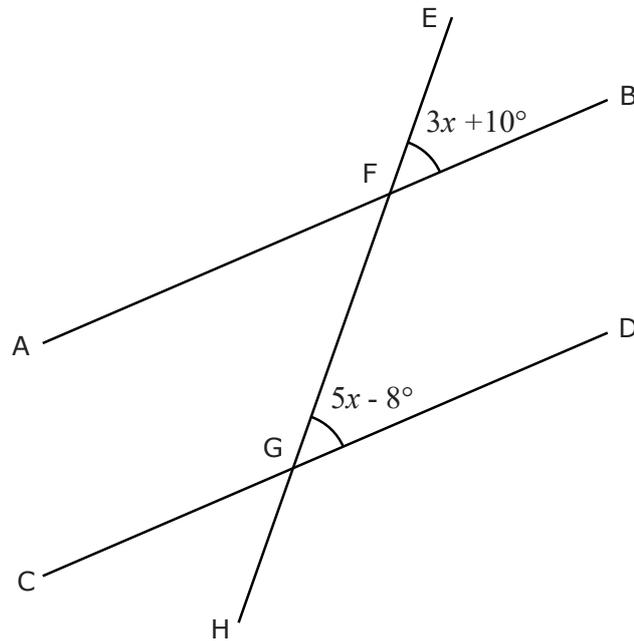


Diagram not drawn to scale

- (a) Show that the value of x is 9° .

(3)

- (b) Giving reasons for your answers, calculate the exact size of:

- (i) angle AFG;

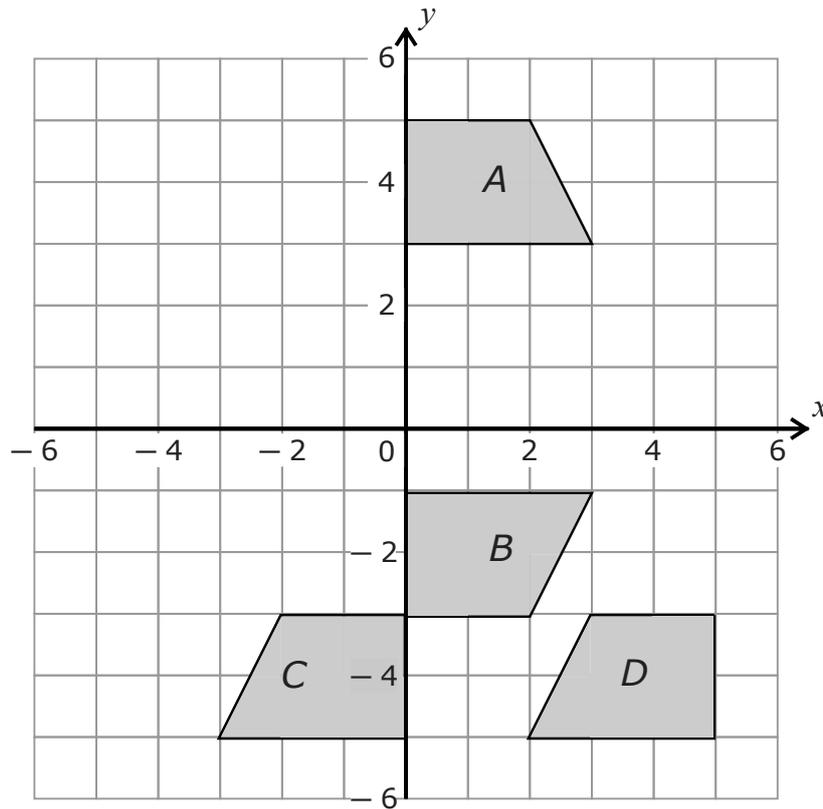
(2)

- (ii) angle DGH.

(2)

(Total: 7 marks)

6



(a) Draw a reflection of shape *A* in the *y* axis.

(2)

(b) In each of the following questions, describe fully the single transformation that maps:

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

(2)

(ii) shape *B* onto shape *C*;

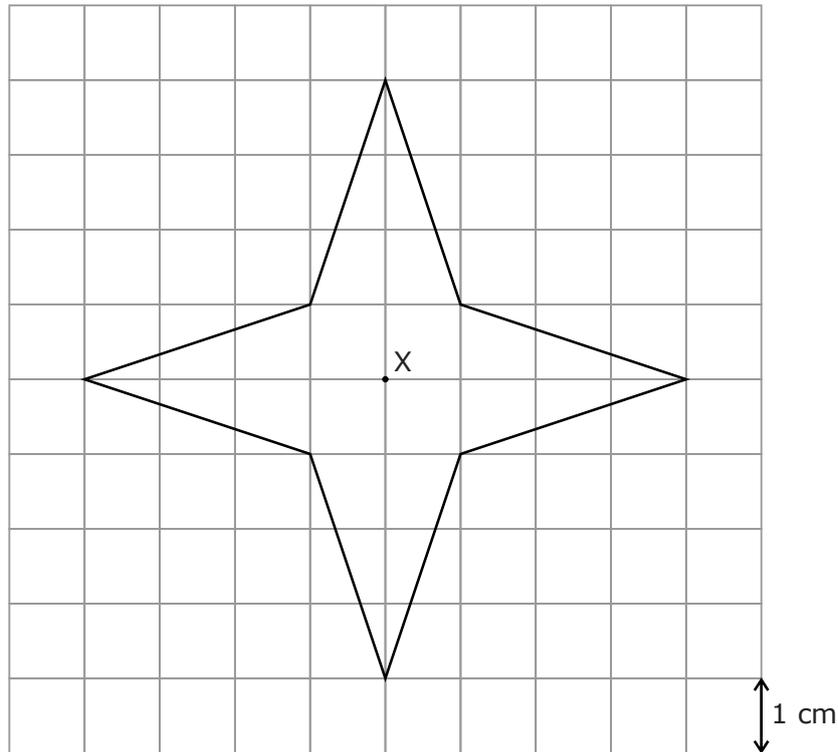
(3)

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

(2)

(Total: 9 marks)

7



- (a) Use Pythagoras theorem to find the length of one side of the star.
Work out the perimeter of the star in cm correct to 1 decimal place.

(4)

- (b) Enlarge the star by a scale factor of $\frac{1}{2}$ using point X as the centre of the enlargement.

(2)

- (c) Complete the statement by choosing the correct word:

The two stars are _____ (congruent / similar). (1)

- (d) Using your answer in part (a), or otherwise, write down the perimeter of the smaller star.

(1)

(Total: 8 marks)

8

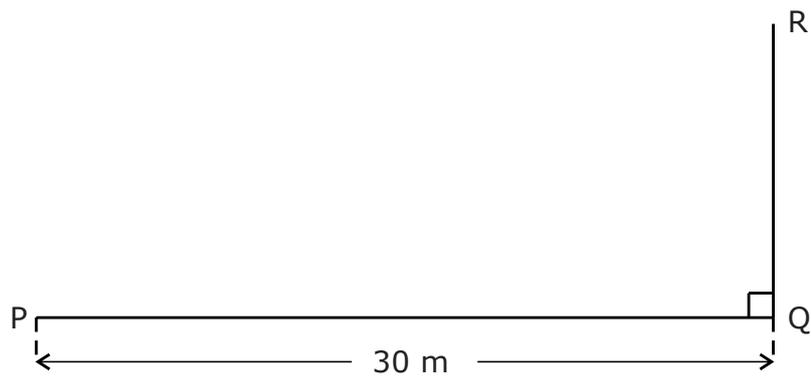


Diagram not drawn to scale

P and Q are two points on horizontal ground. The distance from P to Q is 30 m.

RQ is a vertical pole.

The angle of elevation of R from P is 20° .

(a) Find the height of the pole, in metres, to 3 significant figures.

(3)

(b) Find the length of the distance PR.

(3)

(Total: 6 marks)

9 Sam spent a total of 18 hours on his laptop over the weekend, doing the following activities:

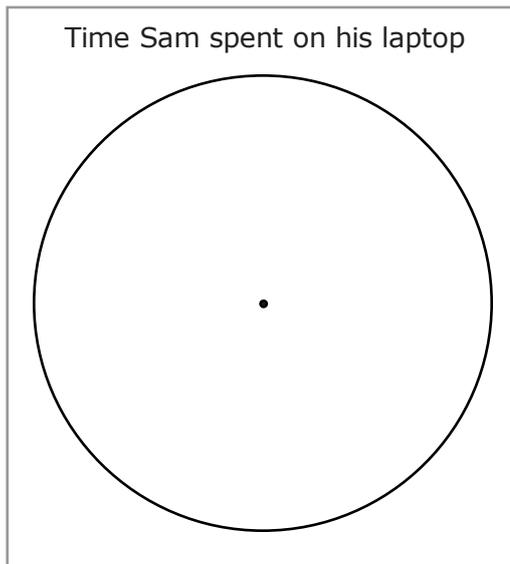
Homework: 5 hours

Research: 3 hours

Watching movies: 6 hours

Playing games: 4 hours

- (a) Draw a pie chart to represent this data.
Show your calculations for the angles of each sector.



(4)

- (b) What fraction of the time spent on the laptop was spent watching movies?
Give your answer in its simplest form.

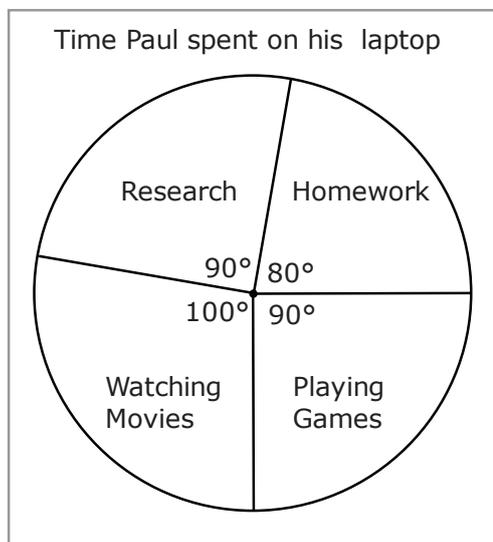
(1)

- (c) Give **TWO** activities which together make up exactly half of Sam's total laptop time.

(1)

- (d) Sam’s friend Paul drew the following pie chart to describe how he spent his time using his laptop over the same weekend.

Is it possible to say who of the two friends spent more time on his homework during this weekend? Explain.



(2)

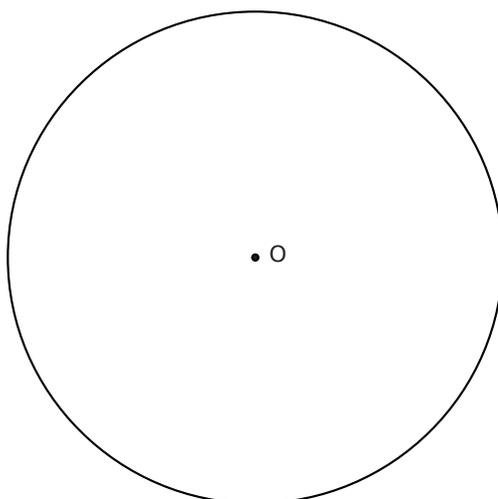
- (e) Name another suitable way to display this type of data.

(1)

(Total: 9 marks)

10 For this question use a pencil, a ruler and a pair of compasses only.

- (a) Construct a regular hexagon whose vertices lie on the circumference of the circle below.



(3)

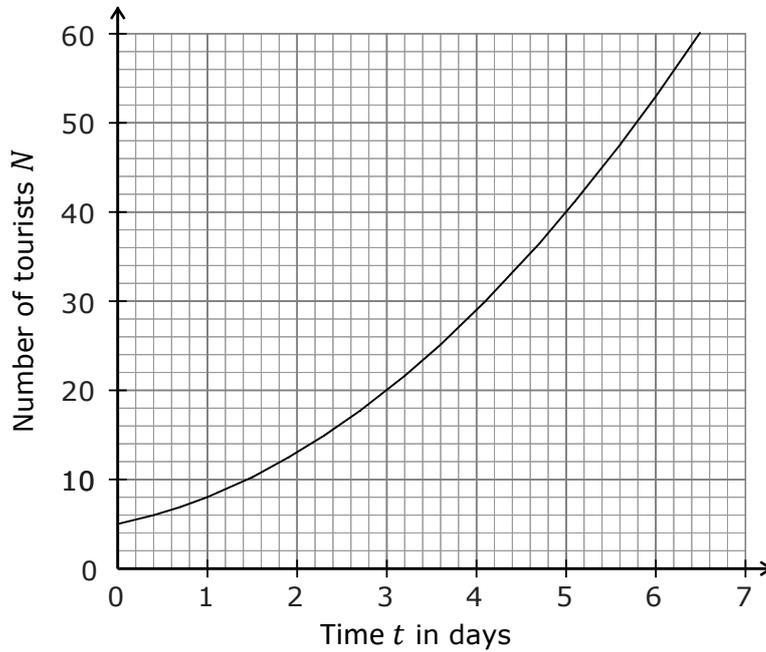
- (b) State the order of rotational symmetry of this polygon.

(1)

(Total: 4 marks)

- 11 A small village is experiencing a significant increase in the number of tourists visiting during the holiday season.

The following graph shows the number of tourists N visiting the village over the first 6 days:



The number of tourists N after t days is given by the quadratic equation:

$$N = at^2 + bt + c$$

where a , b , and c are constants.

- (a) Use the graph to explain that the value of c is 5.

(2)

- (b) From the graph, find the number of tourists at:

- (i) $t = 1$ day;

(1)

- (ii) $t = 3$ days.

(1)

(c) Use the previous data to form two equations in terms of a and b .

(2)

(d) Solve these equations simultaneously to find the values of a and b .

(4)

(e) Use the quadratic equation obtained to predict the number of tourists after 10 days.

(2)

During the same holiday season, a nearby village has been experiencing a decline in the number of tourists.

The number of tourists N after t days is given by the equation:

$$N = -5t + 49$$

(f) Use the axes above to sketch this line.

(3)

(g) On which day was the number of tourists in the two villages the same?

(1)

(Total: 16 marks)

- 12 (a) Express the following as a single algebraic fraction.
Simplify your answers as much as possible.

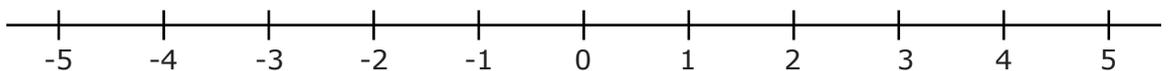
(i) $\frac{3x+y}{25} - \frac{x}{5}$

(2)

(ii) $\frac{3p^3}{8} - \frac{p(p^2+2)}{16}$

(2)

- (b) Represent the inequality $x > -3$ on the number line below.



(1)

(Total: 5 marks)

- 13 (a) Solve the following equation for x .

$$\frac{3\sqrt{x}}{2} + 5 = 20$$

(3)

- (b) Make x the subject of the formula:

$$x + 20 = y + yx$$

(3)

(Total: 6 marks)



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SUBJECT: **Mathematics**
 PAPER NUMBER: II – Level 2-3
 DATE: 30th August 2025
 DURATION: 2 hours 5 minutes

Answer **ALL** questions.

Write your answers in the space available on the examination paper.

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Mark												

- 1 On Cyber Monday, an online UK store offers a 15% discount on all prices. Luca finds a smartphone originally priced at £600. The exchange rate is €1 = £0.83, and the shipping fee is £12.50. Calculate the total amount Luca needs to pay in euros, including the discount and shipping.

(Total: 5 marks)

2 According to the NASA website, these are the diameters of four of the planets in our solar system.

(a) Fill in the table to write each diameter in kilometres in standard form to 2 significant figures.

Planet	Diameter	Diameter in standard form (to 2 significant figures)
Earth	12,742 km	
Mercury	4,880 km	
Neptune	49,244 km	
Saturn	120,536 km	

(2)

(b) Calculate the difference, in km, between the diameter of Earth and the diameter of Saturn. Give your answer in standard form.

(2)

(c) The diameter of Neptune is k times bigger than the diameter of Mercury. Find the value of k to 1 decimal place.

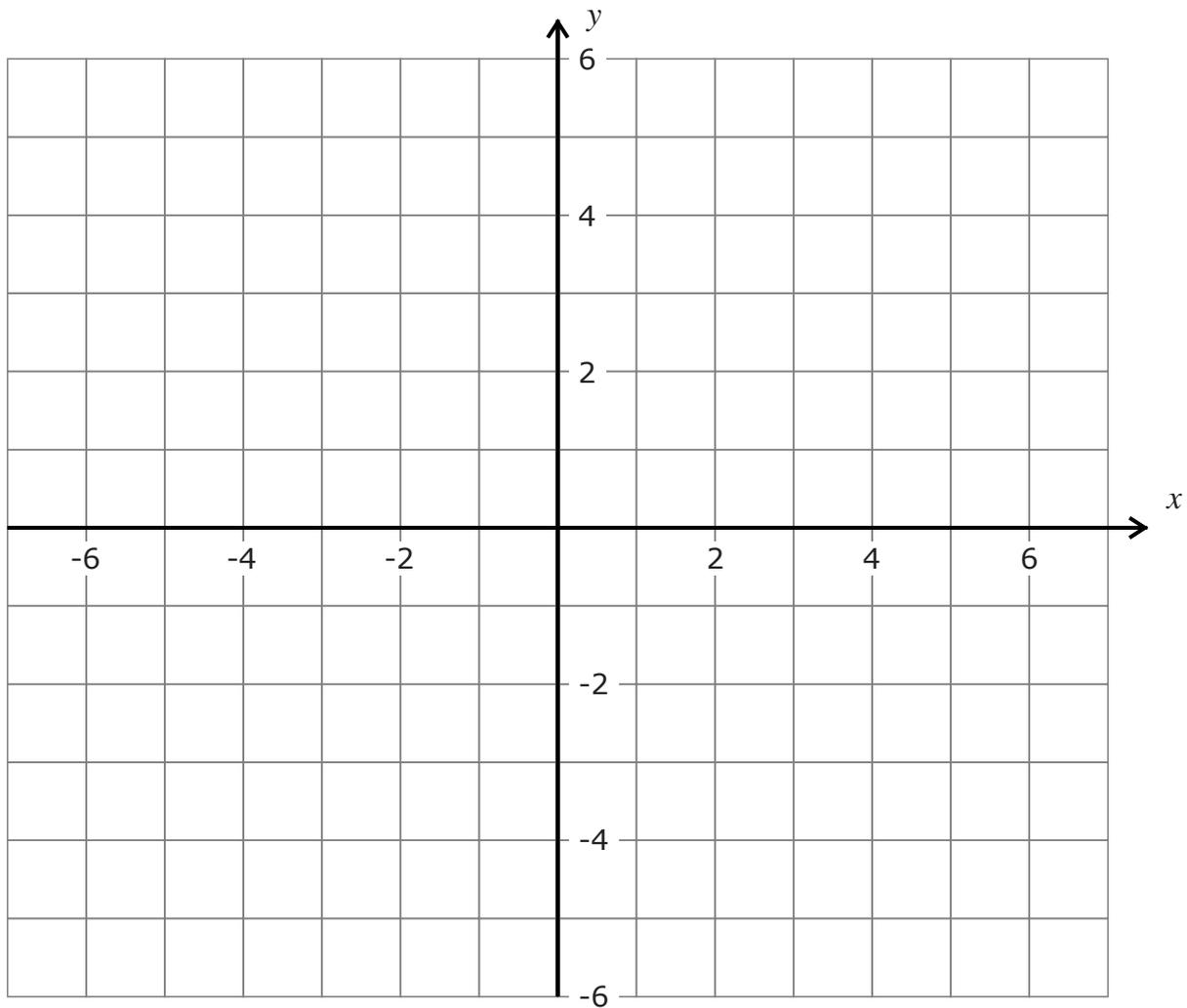
(2)

(d) If the ratio of the diameter of Earth to the diameter of Uranus is approximately 1 : 4, work out the diameter of Uranus.

(2)

(Total: 8 marks)

3 Use the axes below to answer this question.



- (a) Plot kite A with vertices $(2, -1)$, $(4, -1)$, $(3, 2)$ and $(3, -2)$. (2)
- (b) Reflect kite A in the y -axis to get kite B. (2)
- (c) Translate kite A by $\begin{pmatrix} -4 \\ -3 \end{pmatrix}$ to get kite C. (2)
- (d) Using kite A as your starting point, create a tessellation that includes at least three more tiles identical in shape to kite A. (2)

(Total: 8 marks)

- 4 A fair six-sided dice is rolled and a card is drawn at random from a deck of cards containing numbers 1 to 5. The outcomes are added together.
- (a) Complete the possibility space below.

Possibility Space for the Total Score on Dice and Card

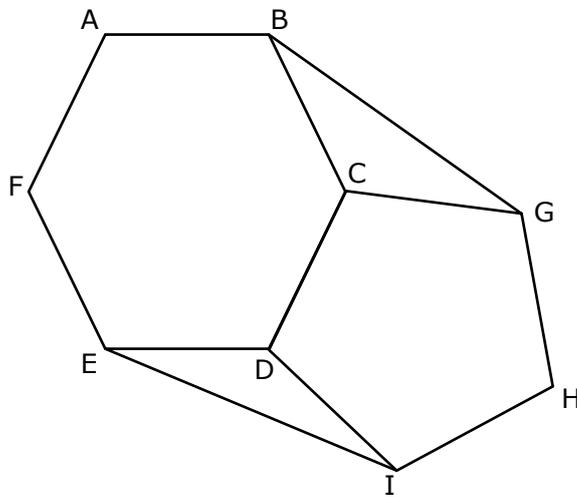
		Dice					
		1	2	3	4	5	6
Card	1	2					
	2				6		
	3		5				
	4					9	
	5			8			

- (b) What is the probability of obtaining a total score of 7? (3)
- (c) What is the probability of obtaining a total score which is a prime number? (2)
- (d) What is the probability of obtaining at least a total score of 8? (2)

(2)

(Total: 9 marks)

- 5 Regular hexagon ABCDEF and regular pentagon CDIHG are drawn next to each other, sharing one of their sides. Point B is joined to point G, and point E joined to point I to form two triangles, BCG and EDI.



- (a) Work out the size of angle BCG. Show your working clearly.

(4)

- (b) Explain why triangle BGC is isosceles.

(2)

- (c) Show that triangle BCG and triangle EDI are congruent, and explain why BG and EI are equal.

(4)

(Total: 10 marks)

6 A boat sails from a point P at a port, on a bearing of 100° for 50 km. It then turns and sails on a bearing of 240° for 74 km to arrive at point Q.

(a) Continue the diagram below to produce a scale diagram of the boat's journey. Use a scale of 1 cm to 10 km.



(4)

Use your scale diagram to find:

(b) the distance, in km, of the point Q from P;

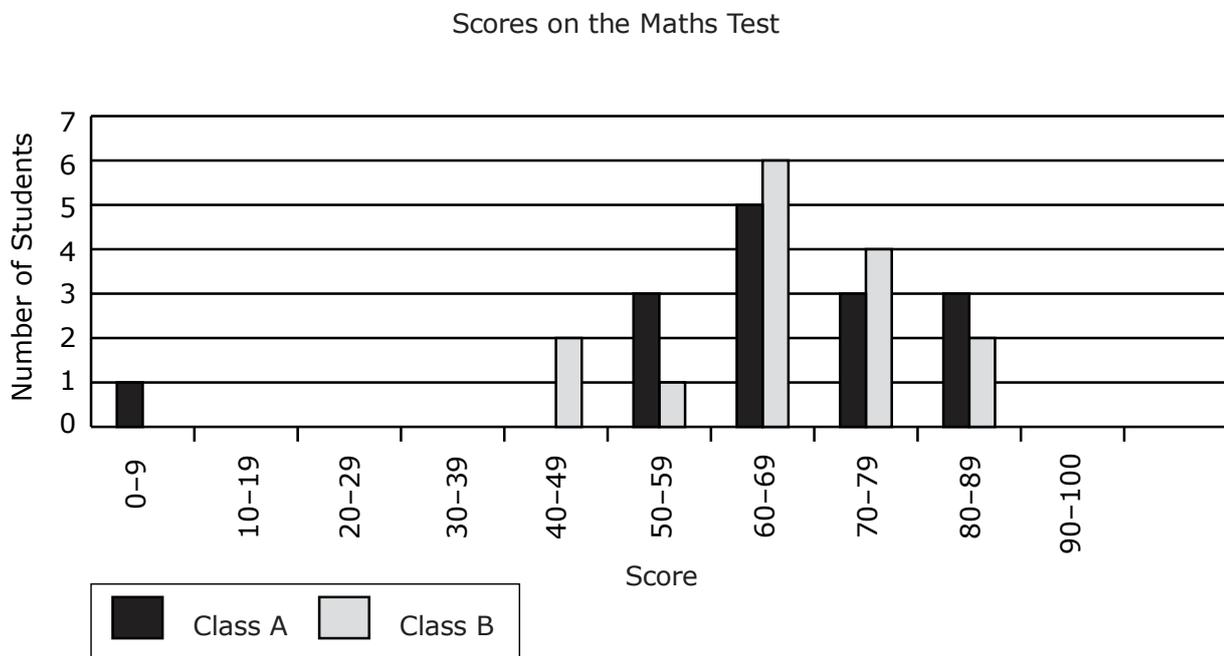
(2)

(c) the bearing of point P from Q.

(1)

(Total: 7 marks)

- 7 Class A and Class B both sat for the same Maths test.
 The clustered bar chart below shows their test scores. The pass mark is 50%.
 Each class has 15 students.



- (a) Work out an estimate for the mean score for Class A and for Class B.

(4)

- (b) What statistical reason could Class B use to argue that their class performed better than Class A?

(2)

- (c) What statistical reason could Class A use to argue that their class performed better than Class B?

(2)

(Total: 8 marks)

- 8 In a local band orchestra, musicians are being arranged in two sections: string section and wind section.

The total number of musicians in the orchestra is 95.

The number of musicians in the wind section is one and a half times the number of musicians in the string section.

- (a) If s represents the number of musicians in the string section, and w represents the number of musicians in the wind section, form **TWO** equations that represent this situation.

(4)

- (b) Solve these equations simultaneously to find the number of musicians in **each** section.

(4)

(Total: 8 marks)

- 9 The surface area of a cylinder is given by $S = 2\pi r^2 + 2\pi rh$

- (a) Make h the subject of the formula.

(2)

- (b) If the radius and surface area of a cylindrical soft drink can are 3.3 cm and 285 cm² respectively, find the height of the can.

(2)

(Total: 4 marks)

- 10 Three straight roads intersect at points A, B and C to form a triangle. The distances AB, BC and CA are 4.5 km, 2.8 km and 5.3 km respectively.
- (a) Using ruler, pencil and compasses only, draw a scale diagram of the three intersecting roads. Use a scale of 1 cm for 1 km.

(3)

- (b) Using a method other than your scale diagram:
- (i) confirm that the size of $\angle ABC$ should be 90° ;

(2)

- (ii) work out the size of $\angle ACB$.

(3)

- (c) Raquel takes 25 minutes to run from A to B. Calculate her average speed in metres per second.

(2)

(Total: 10 marks)

- 11 A hot air balloon is launched from a hilltop 20 metres above the ground. Its height h (in metres) above the ground at time t (in minutes) is given by the equation:

$$h = -\frac{1}{4}t^2 + 10t + 20$$

where $t = 0$ represents the moment the balloon is released from the hilltop.

- (a) Complete the table of values for the equation of $h = -\frac{1}{4}t^2 + 10t + 20$.

t	0	6	12	18	24	30	36	42
h		71					56	

(3)

- (b) Use the axes on the next page to plot the graph of $h = -\frac{1}{4}t^2 + 10t + 20$ for values of t between 0 and 42.

(3)

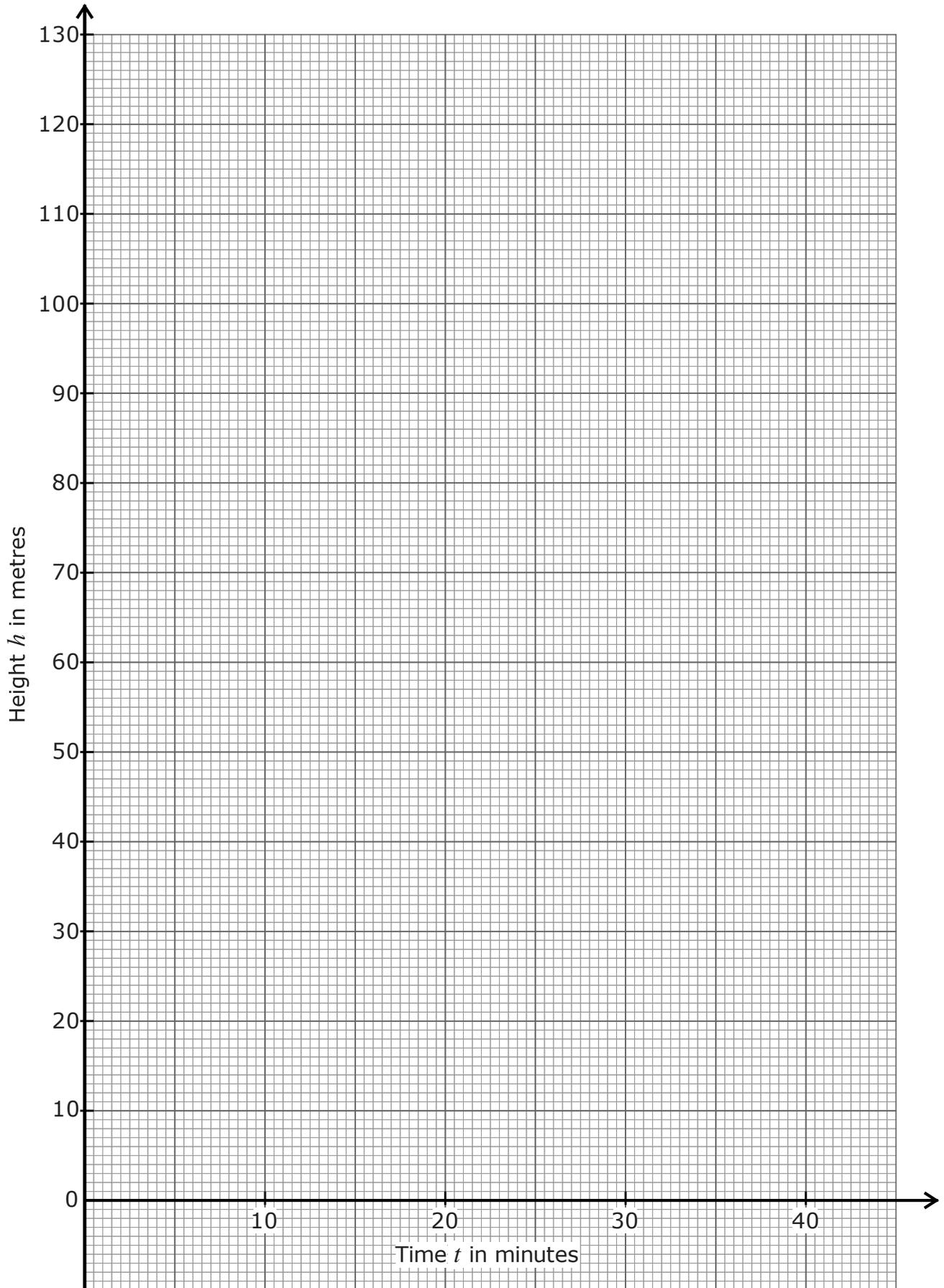
- (c) Find the maximum height reached by the balloon and the time at which it occurs.

(2)

- (d) Determine the time when the balloon reaches the ground.

(2)

DO NOT WRITE ABOVE THIS LINE



(Total: 10 marks)

12 (a) Factorize completely: $10xy^2 + 25x^3y$

(2)

(b) Expand and simplify: $3(a + 5b) - 4(2a - b)$

(4)

- (c) A number is multiplied by 5, then 8 is subtracted from the result. The final answer is 2 more than three times the original number.

What is the original number?

(4)

(d) Simplify: $\frac{(4p^2q^3)^2}{2p^4q}$

(3)

(Total: 13 marks)