Index Number:_____ SEC23/1a.24s

L-Università ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

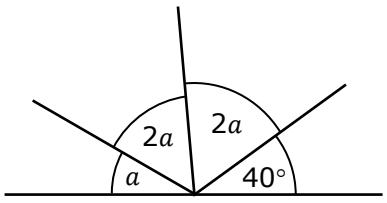
SECONDARY EDUCATION CERTIFICATE LEVEL
2024 SUPPLEMENTARY SESSION

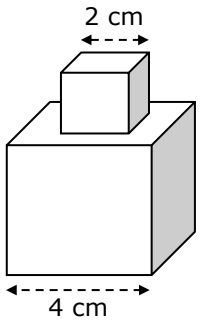
SUBJECT: **Mathematics** PAPER: I – Section A (Non-Calculator Section)
DATE: 31st August 2024 TIME: 20 minutes

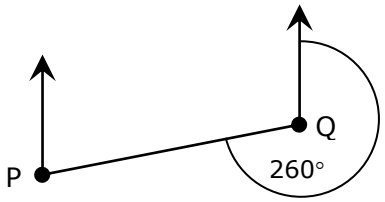
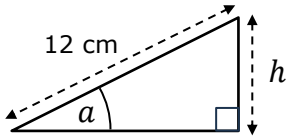
Attempt **ALL** questions.

Write your answers in the space available on the examination paper.
The use of calculators and protractors is **not** allowed.
It is not necessary to show your working.
This paper carries a total of 20 marks.

QUESTIONS AND ANSWERS **ALL QUESTIONS CARRY ONE MARK**	**SPACE FOR ROUGH WORK (IF NECESSARY)**
1 Complete the sequence: 6.00, 5.75, 5.50, _____ , _____ , 4.75	
2 Simplify: $5s - 3(s + t)$ **Ans** _____	
3 Work out: $14 + 56 \div 7$ **Ans** _____	
4 Find the value of: $3^3 - \sqrt{9} - 3^0 + 3^{-2}$ **Ans** _____	

QUESTIONS AND ANSWERS **ALL QUESTIONS CARRY ONE MARK**	**SPACE FOR ROUGH WORK (IF NECESSARY)**
5 Circle the smallest number from the following: 22% $\frac{2}{9}$ 0.2 $\frac{11}{5}$	
6 The following are the ages of the members of a cycling club: 27, 17, 35, 24, 9, 41, 37, 59, 32 Find the range of the ages of the members of the club. **Ans** _____	
7 Work out: $\frac{4}{5} + \frac{3}{4} \times \frac{8}{15}$ **Ans** _____	
8 Calculate the value of a.  **Ans** _____	
9 The mean of 5 numbers is 41. Four of them are: 37, 38, 43 and 42. Find the fifth number. **Ans** _____	

QUESTIONS AND ANSWERS **ALL QUESTIONS CARRY ONE MARK**	**SPACE FOR ROUGH WORK (IF NECESSARY)**
10 Given that 270 × 35 = 9450, find the value of: 27 000 × 3.5 **Ans** _____	
11 Three of the angles of a quadrilateral are 54°, 70° and 116°. Work out the size of the fourth angle. **Ans** _____	
12 Simplify: $4a^5 \times 5a^{-2} \div 2a^2$ **Ans** _____	
13 A cylinder of uniform cross-section is 6 cm high and has a volume of 348 cm^3. Calculate the cross-sectional area of the cylinder. **Ans** _____	
14 There is a probability of $\frac{1}{9}$ that cash counter A is available when Aldo has to pay for his shopping at the supermarket. Aldo visits the supermarket 45 times in a year. How many times does he expect cash counter A to be available? **Ans** _____	
15 Work out the total volume of the solid shape that is made up of a cube of side 2 cm on top of another cube of side 4 cm.  **Ans** _____	

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
16 Which two fractions from the list below make 7 when multiplied? $2\frac{1}{4}$, $\frac{21}{8}$, $3\frac{1}{5}$, $2\frac{2}{3}$, $\frac{12}{5}$ **Ans** _____	
17 Simplify: $\frac{6s^3t}{4st^2}$ **Ans** _____	
18 The bearing of P from Q is 260°. Calculate the bearing of Q from P.  **Ans** _____	
19 Work out h, the height of the triangle, given that $\sin a = \frac{1}{2}$.  **Ans** _____	
20 *Dividing an even number by another even number gives an even number.* For the above statement, which **one** of the following is correct? **A.** The statement is always true. **B.** The statement is true only once. **C.** The statement is sometimes true. **D.** The statement is never true. **Ans** _____	

Index Number:_____ SEC23/1b.24s

L-Università ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

SECONDARY EDUCATION CERTIFICATE LEVEL
2024 SUPPLEMENTARY SESSION

SUBJECT:	**Mathematics**
PAPER NUMBER:	I – Section B (Calculator Section)
DATE:	31st August 2024
TIME:	1hr and 45 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.

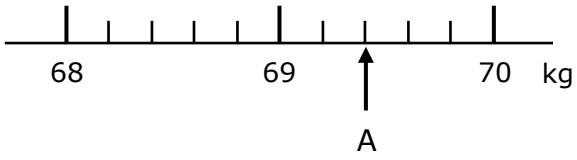
The use of non-programmable electronic calculators with statistical functions and of mathematical instruments is allowed.

Candidates are allowed to use transparencies for drawing transformations.

This paper carries a total of 80 marks.

	For Office Use Only										
Sec A	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**Total**

1 (a) The following shows the scale on a weighing scales.



(i) What reading does arrow A show? (1)

(ii) Mark with an arrow 68.7 kg. Label your arrow B. (1)

(b) Fill in the blanks:

(i) 3.15 km = _____ metres (1)

(ii) 6450 ml = _____ litres (1)

(iii) 2.5 hours = _____ minutes (1)

(iv) 56 hours = _____ days _____ hours (1)

(Total: 6 marks)

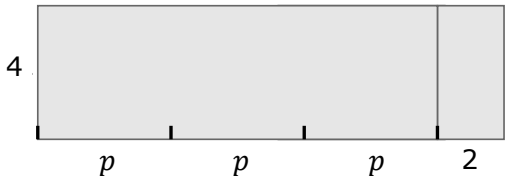
2 Tick (✓) True or False.

		True	False	
(a)	$\frac{3}{8} = \frac{21}{56}$			(1)
(b)	$(-2\ -1)^2 = -9$			(1)
(c)	$62\% > 0.625$			(1)
(d)	$33\% < \frac{1}{3}$			(1)
(e)	9 is a factor of 299			(1)
(f)	ninety-one is a multiple of 7			(1)

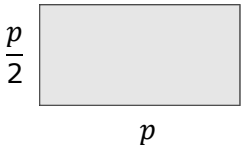
(Total: 6 marks)

3 Write an expression for the area of each of the shaded shapes below.
Give your answers in terms of p. Write each answer in its simplest form.

(a)



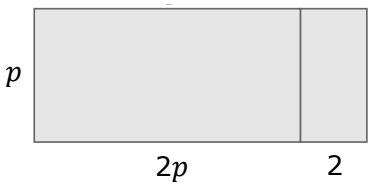
(b)



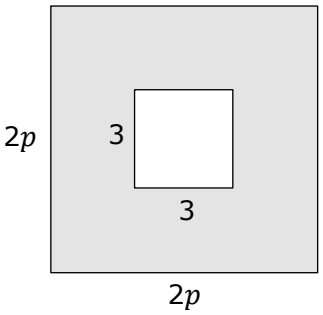
_____ _____

(4)

(c)



(d)



_____ _____

(4)

(Total: 8 marks)

4 Lisa makes and sells bead necklaces.

(a) Lisa is making a bead necklace using white, violet and purple beads in the ratio 3 : 2 : 5 respectively.

White beads cost €1.40 each and the violet and purple beads cost €1.80 each.
Lisa needs 50 beads to make the necklace.

(i) How many beads of each colour are needed?

(2)

(ii) How much will the necklace cost?

(2)

(iii) Lisa wants to sell the necklace at a 20% profit.
At what price must she sell the necklace?

(2)

(b) Lisa is making another necklace using white, black and grey beads in the ratio 3 : x : 2 respectively. She uses 85 beads altogether of which 15 are white.
How many black beads does she need?

(3)

(Total: 9 marks)

5 A printer uses the following formula to work out the amount of money he charges when printing adverts:

$$C = 50 + 0.3N$$

C is the amount he charges in euro and N is the number of adverts that need to be printed.

(a) How much does the printer charge for an order of 1500 adverts?

(1)

(b) The printer charges €650 for an order.
What is the number of adverts that have been ordered?

(3)

(c) Make N the subject of the formula $C = 50 + 0.3N$.

(2)

(Total: 6 marks)

6 (a) Find the number of sides of a regular polygon if each interior angle is 140°?

(3)

(b) The diagram below shows a hexagon ABCDEF.
Angle BCD is 120°, angle DEF is 155° and both angles CBF and BFE are equal to 90°.
Triangle ABF is equilateral.

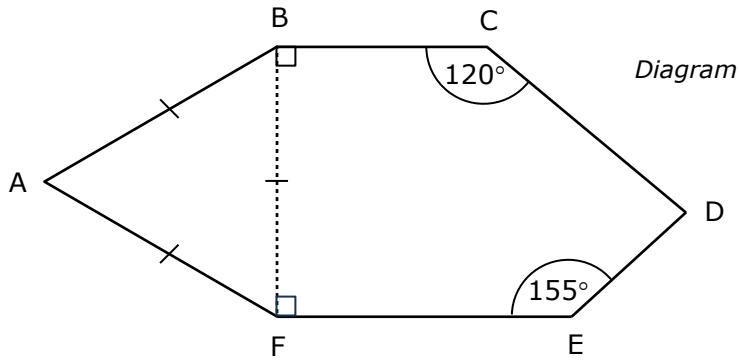


Diagram not drawn to scale

Find the size of:

(i) angle ABC;

(1)

(ii) angle CDE.

(3)

(Total: 7 marks)

7 Luca is organising a charity race for a team of cyclists across Europe.
The race starts at Bari and ends in Brussels, a cycling distance of 2100 km.

(a) Luca thinks that the team can cycle at an average speed of 24 km per hour for 8 hours a day. At this rate, in how many days will the team finish the race?

(3)

(b) The team wants to complete the race in ten days.
At what average speed must the team cycle to finish the race if they cycle for 8 hours a day? Give your answer in km per hour.

(3)

(Total: 6 marks)

8 Points W, X, Y and Z lie on a circle, centre O, such that XYZ is an isosceles triangle.
Angle XYZ is 74° and angle YZW is 100°.

Work out the size of the angles marked a, b and c.
Give reasons for your answers.

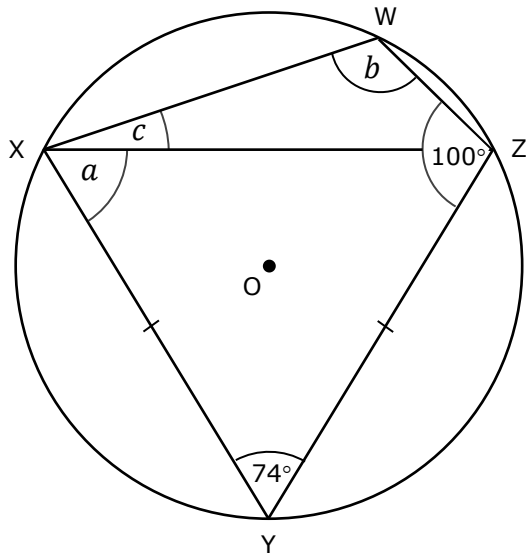


Diagram not drawn to scale

(Total: 6 marks)

9 The diagram below shows the plan of a conference hall. The curve CD is the arc of a circle of radius 24 m and it is subtended by an angle of 60°.

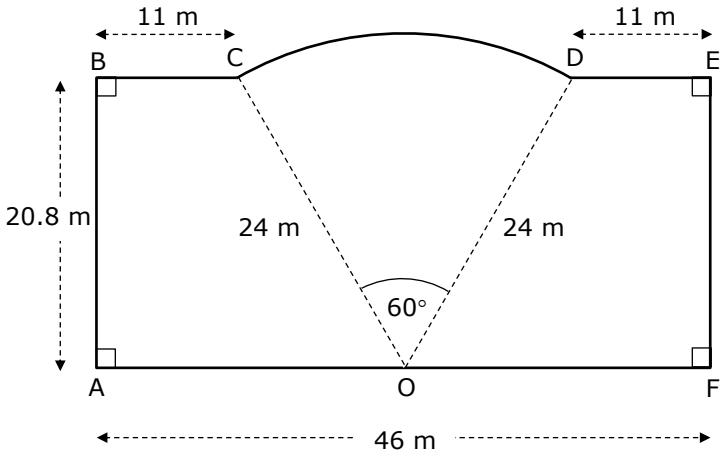


Diagram not drawn to scale

(a) Calculate the area of sector COD.

(2)

(b) Work out the total area of the conference hall.

(3)

(Total: 5 marks)

10 Eight athletes form a team. The table below shows their heights in metres.

1.76	1.81	1.86	1.89	1.77	1.86	1.82	1.73

(a) Is height continuous data or discrete data?

(1)

(b) What is the median height?

(2)

(c) What is the modal height?

(1)

(d) Calculate the mean height.

(2)

(e) An athlete is chosen at random from the team.
What is the probability that the chosen athlete is shorter than 1.85 m?

(1)

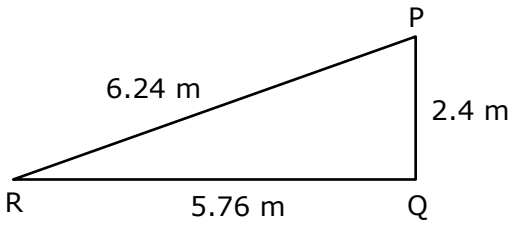
(f) If the tallest and the shortest athlete are removed from the team, and replaced by two athletes of equal height, the new mean is 1.82 m. What is the height of these two new athletes?

(4)

(Total: 11 marks)

11 Kris encloses part of a field by a fence to form a triangle PQR such that PR = 6.24 m, QR = 5.76 m and PQ = 2.4 m.

Diagram not drawn to scale



(a) Show that angle PQR is a right-angle.

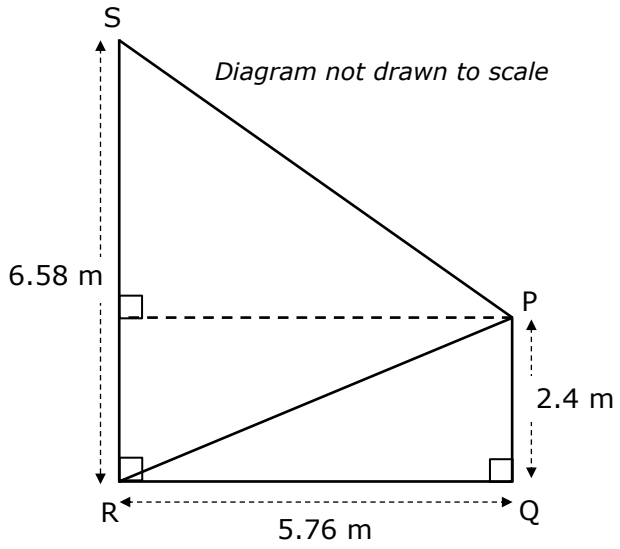
(2)

(b) Calculate the size of angle QRP correct to one decimal place.

(2)

Kris builds two fences, PS and RS, to enclose another part of the field as shown. Fence RS is 6.58 m long.

Diagram not drawn to scale



(c) Calculate the length of fence PS.

(2)

(d) Calculate the size of angle SPR correct to the nearest degree.

(4)

(Total: 10 marks)

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Index Number:_____ SEC23/2B.24s

L-Università ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

SECONDARY EDUCATION CERTIFICATE LEVEL
2024 SUPPLEMENTARY SESSION

SUBJECT:	**Mathematics**
PAPER NUMBER:	IIB
DATE:	31st August 2024
TIME:	4:00 p.m. to 6:05 p.m.

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 of mathematical instruments is allowed.

Candidates are allowed to use transparencies for drawing transformations.

This paper carries a total of 100 marks.

For Office Use Only

Question No	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Mark										
Question No	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Mark										

Total Mark

1 A special die has ten faces numbered from 1 to 10.
When the die is rolled it is equally likely to land on any of its ten faces.
Find the probability that the die lands on:

(a) an even number;

(1)

(b) a prime number;

(1)

(c) number 11;

(1)

(d) a square number;

(1)

(Total: 4 marks)

2 Find the size of angles r, s and t. Give reasons for your answers.

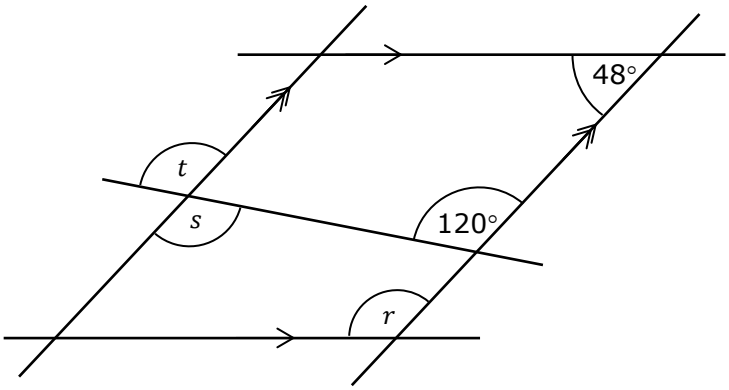


Diagram not drawn to scale

(Total: 6 marks)

3 Complete these statements. The first one has been done for you.

(a) (i) There are 100 centimetres in one metre.

(ii) A centimetre is 0.01 of a metre.

(b) (i) There are _____ millimetres in one centimetre.

(ii) A millimetre is _____ of a centimetre.

(2)

(c) (i) There are _____ grams in one kilogram.

(ii) A gram is _____ of a kilogram.

(2)

(d) (i) There are _____ millilitres in one litre.

(ii) One thousandth of a litre is a _____ .

(2)

(Total: 6 marks)

4 Here are four numbers written in standard form:

1.5×10^4, 4.8×10^6, 3.2×10^2, 7.5×10^3

In the following questions, give your answer in standard form.

(a) Work out the smallest answer possible when two of these four numbers are **multiplied** together.

(2)

(b) Work out the largest answer possible when two of these four numbers are **added** together.

(1)

(Total: 3 marks)

5 The perimeter of a triangle is 24 cm. The sides of the triangle are x, $(x + 2)$ and $(x + 4)$.

(a) Form an equation and solve it to find the value of x.

(3)

(b) What type of triangle is this? Explain your reasoning.

(2)

(Total: 5 marks)

6 Mario bought four headphone sets from an online store based in England.
Each headphone set costs £59.

(a) The currency exchange rate is £1 = €1.1701.
How much did Mario pay, in euro, for the four headphone sets?

(2)

(b) Mario sold the four headphone sets for €320.

(i) How much profit did he make?

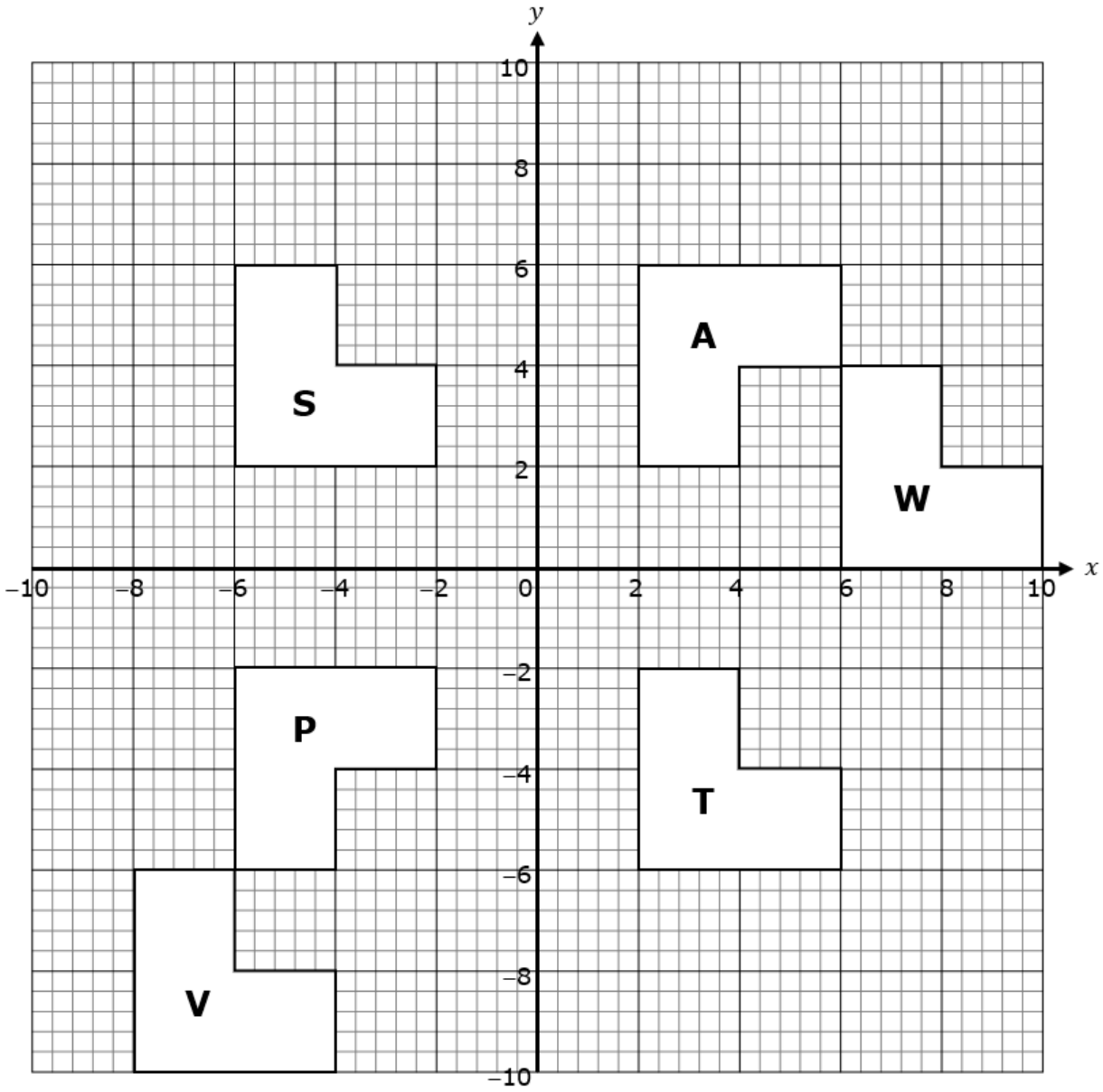
(1)

(ii) Express the profit made as a percentage of the total amount Mario spent.

(2)

(Total: 5 marks)

7



Use the diagram above to fill in the empty cells of the following table:

Object	Transformation	Image	
A	Rotation by 90° anticlockwise about (0, 0)		(1)
P	Reflection in the line $y = -x$		(1)
	Translation by $\begin{pmatrix} -12 \\ 2 \end{pmatrix}$	S	(1)
T		P	(2)

(Total: 5 marks)

8 (a) Write each number correct to one significant figure and work out an estimate for S.

$$S = \frac{5.86 + \sqrt{88.21 \times 11.35}}{3.82}$$

(3)

(b) Find the difference between the actual value of S and the estimated value obtained in part (a). Give your answer correct to three decimal places.

(2)

(Total: 5 marks)

9 The scale of a map is 1 : 10 000.

(a) What is the actual distance, in metres, represented by 8.2 cm on the map?

(2)

(b) What distance on the map represents an actual distance of 3 km?
Give your answer in centimetres.

(3)

(Total: 5 marks)

10 For each statement, tick (✓) the box Always True, Never True or Sometimes True.

Give an example **only** when statement is Sometimes True.

The first one has been done for you.

	Statement	Always True	Never True	Sometimes True	Example when Sometimes True	
(a)	The three angles of a triangle add up to 360°.		✓			
(b)	The lengths of the sides of a triangle are equal.					(1)
(c)	The angle at the circumference of a circle is twice the angle at centre.					(1)
(d)	The exterior angle of a triangle is equal to the sum of the two opposite interior angles.					(1)
(e)	All congruent triangles are similar.					(1)

(Total: 4 marks)

11 Maya is going on a holiday to London. The plane should leave Malta at 08:25 and takes 3 hours and 25 minutes to arrive in London.

(a) At what time should the plane land in London, if the time in London is one hour behind Malta?

(3)

(b) The departure time was delayed by 25 minutes but the flight time took 10 minutes less than expected. At what time did the plane land in London?

(2)

(Total: 5 marks)

12 Solve the following simultaneous equations:

$$6x - y = 25$$
$$4x + 3y = 57$$

(Total: 4 marks)

13 A bridge connects two banks of a river. A stone is dropped from a point P on the bridge. The equation $s = 4.9t^2$ gives the vertical distance s metres travelled by the stone in time t seconds from point P.

(a) The stone takes 5 seconds to travel from point P to the surface of the river. What is the height of point P from the surface of the river?

(1)

(b) How long does the stone take to travel a vertical distance of 100 metres from point P? Give your answer in seconds correct to one decimal place.

(2)

(c) Make t the subject of the formula $s = 4.9t^2$.

(2)

(Total: 5 marks)

14 (a) Construct an equilateral triangle PQR with sides 8 cm.

(2)

(b) Construct the perpendicular bisector of PQ.

(2)

(c) Construct the perpendicular bisector of PR.

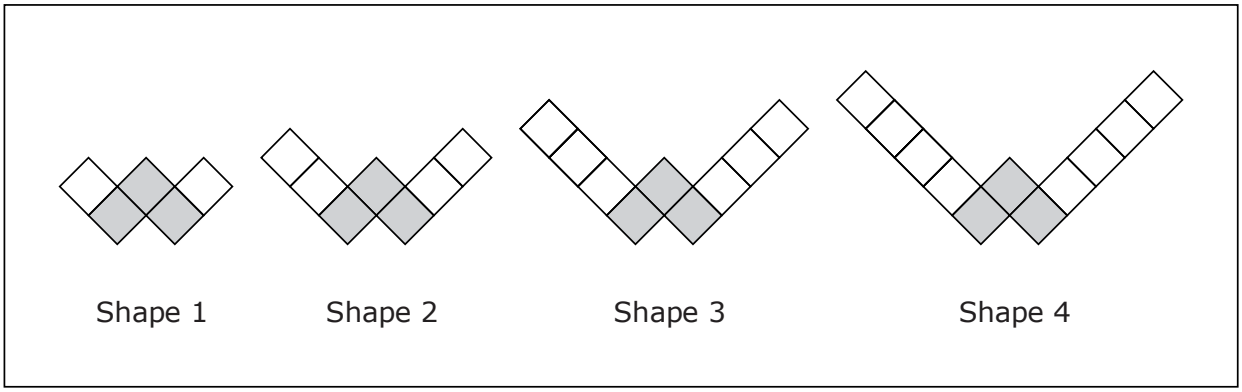
(1)

(d) Mark the point X where the two bisectors meet.
Draw a circle with centre X which passes through the vertices P, Q and R.
Measure the radius of the circle.

(2)

(Total: 7 marks)

15 The shapes below follow a pattern.



Use the same pattern to answer the following questions.

(a) (i) How many white squares are there in Shape 5? _____ (1)

(ii) How many grey squares are there in Shape 5? _____ (1)

(b) (i) How many white squares are there in Shape 10? _____ (1)

(ii) How many grey squares are there in Shape 10? _____ (1)

(c) (i) How many white squares are there in Shape n? _____ (1)

(ii) How many grey squares are there in Shape n? _____ (1)

(iii) What is the total number of squares in Shape n? _____ (1)

(Total: 7 marks)

16 The table shows the hours Ella works during a whole week.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Number of Hours	8	8	0	6	8	7	x

Ella is paid at a basic rate of €14.00 per hour.
She is paid one and a half times the basic rate for work on Saturday and Sunday.

(a) Calculate Ella's total pay from Monday to Saturday.

(2)

(b) Ella was paid a total of €672 for the whole week.
How many number of hours, x, did Ella work on Sunday?

(3)

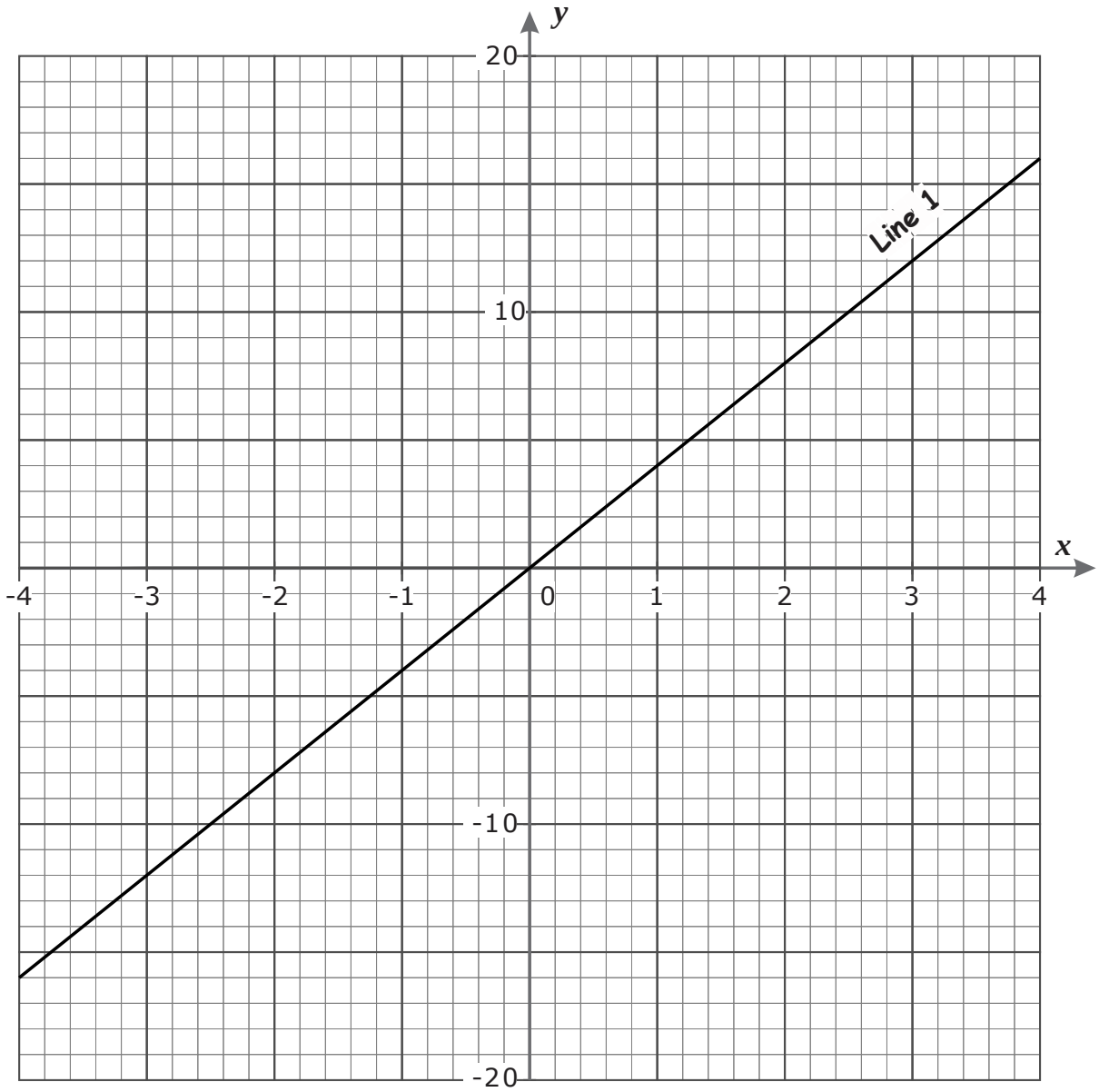
(Total: 5 marks)

17 A bathroom is 2.2 m wide and 2.6 m long. It has a height of 3 m.
The bathroom has a square window of side 80 cm and the door measures 80 cm by 200 cm.

Square tiles measuring 20 cm by 20 cm are used to cover the walls.
How many tiles are needed to cover the four walls of the bathroom?

(Total: 5 marks)

18



(a) Use the graph to work out the equation of Line 1.

(1)

(b) On the same axes, draw the line with equation $y = -3x + 7$.

(3)

(c) Write down the coordinates of the point of intersection of the two lines.

(1)

(Total: 5 marks)

19 The diagram below shows the position of three landmarks. The Science Museum, S, is on a bearing of 120° from the Aquarium, A. The distance AS is 10 km. The Park, P, is on a bearing of 210° from the Aquarium, A. The distance AP is 15 km.

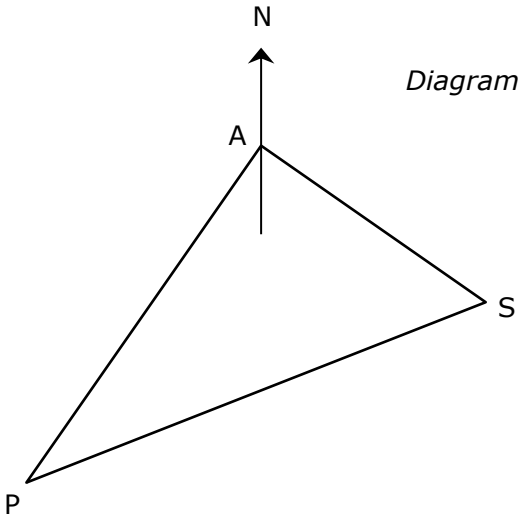


Diagram not drawn to scale

Label the diagram to be able to answer the following questions.

(a) What is the size of angle PAS?

(1)

(b) Find the distance between the Science Museum, S, and the Park, P.

(2)

(Total: 3 marks)

20 Square ABCD and square AEFG have sides 5 cm and 3 cm respectively.
The lines BE and DG are drawn to form triangles ABE and ADG.

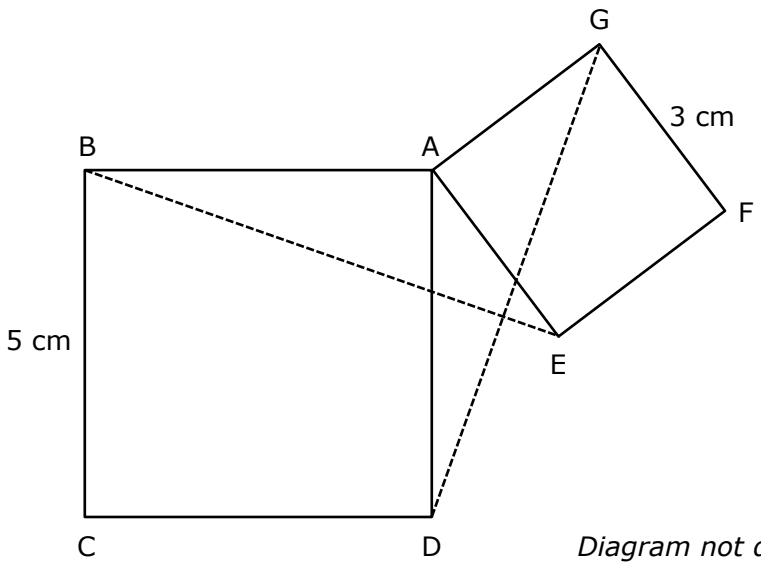


Diagram not drawn to scale

(a) Show that triangles ABE and ADG are congruent.

(4)

(b) Given that angle DAE is 40° and angle ADG is 14°, work out the size of angle AEB.

(2)

(Total: 6 marks)

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