Index Number:_____ SEC23/1a.24m

L-Università ta' Malta

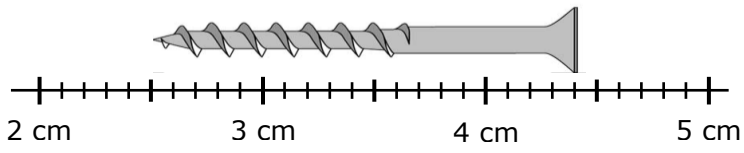
MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

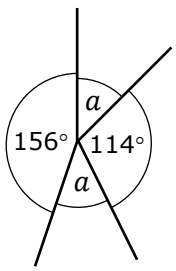
SECONDARY EDUCATION CERTIFICATE LEVEL
2024 MAIN SESSION

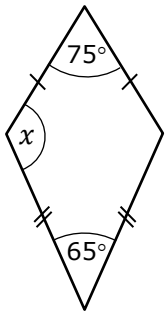
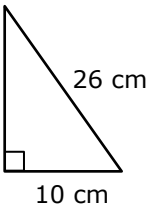
SUBJECT: **Mathematics** PAPER: I – Section A (Non-Calculator Section)
DATE: 4th May 2024 TIME: 20 minutes

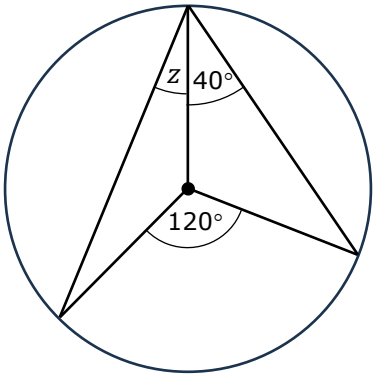
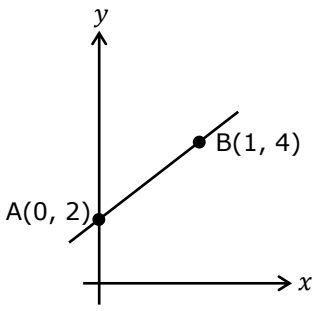
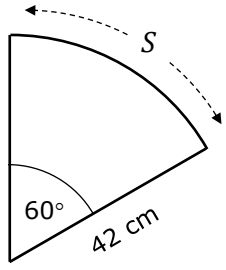
Attempt **ALL** questions.

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 Write two million and thirty-five thousand in digits. **Ans** _____	
2 Which of the following is the smallest? $\frac{1}{5}$, 2.5×10^{-2}, 4^{-1} **Ans** _____	
3 Complete the sequence: 7.72, _____ , 7.48, 7.36, 7.24	
4 What is the length of the screw?  **Ans** _____	
5 Work out: $3\frac{3}{4} + 1\frac{1}{8}$ **Ans** _____	

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
6 Work out: $5^{-2} \times 5^3 + 5^0$ **Ans** _____	
7 What is the value of x if $4^x = 64$? **Ans** _____	
8 On a map, a distance of 2.4 cm represents 24 km. What is the scale of the map? **Ans** _____	
9 The function $f(x) = 3(5 - x)$. Find x when $f(x) = 18$. **Ans** _____	
10 Work out: $(1.4 \times 6.32) + (1.6 \times 6.32)$ **Ans** _____	
11 Work out the value of the angle marked a.  **Ans** _____	

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
12 Work out: $1\frac{2}{15} \div 6\frac{4}{5}$ **Ans** _____	
13 Make x the subject of the formula $\sqrt{\frac{x}{a}} = b$. **Ans** _____	
14 The bearing of B from A is 70°. What is the bearing of A from B? **Ans** _____	
15 Simplify: $\frac{3a^2b^3}{2a^3} \times \frac{4}{b}$ **Ans** _____	
16 Work out the value of x.  **Ans** _____	
17 Calculate the area of this triangle.  **Ans** _____	

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
18 Calculate the value of z.  **Ans** _____	
19 Find the equation of the line that is parallel to line AB and passes through (0, 7).  **Ans** _____	
20 Calculate the length of arc S in this sector of a circle. Use $\pi = \frac{22}{7}$.  **Ans** _____	

Index Number:_____ SEC23/1b.24m

L-Università ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

SECONDARY EDUCATION CERTIFICATE LEVEL
2024 MAIN SESSION

SUBJECT:	**Mathematics**
PAPER NUMBER:	I – Section B (Calculator Section)
DATE:	4th May 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**	**Total**

1 Simplify, where possible, the following algebraic expressions.
When this is not possible, rewrite the given expression unchanged.

Example 1	$4a + 2a$	$6a$
Example 2	$a + b$	$a + b$

(a)	$a + 4a$		(1)
(b)	$5b - 3$		(1)
(c)	$a + (a + b)$		(1)
(d)	$(b + a) + (b - a)$		(1)
(e)	$3(b + a) - 2(b - a)$		(1)
(f)	$\frac{4a + 4}{b}$		(1)
(g)	$\frac{4ab - b^2}{b}$		(1)

(Total: 7 marks)

2 (a) The average of two fractions is $\frac{2}{3}$. One of the fractions is $\frac{2}{7}$.
Calculate the other fraction.

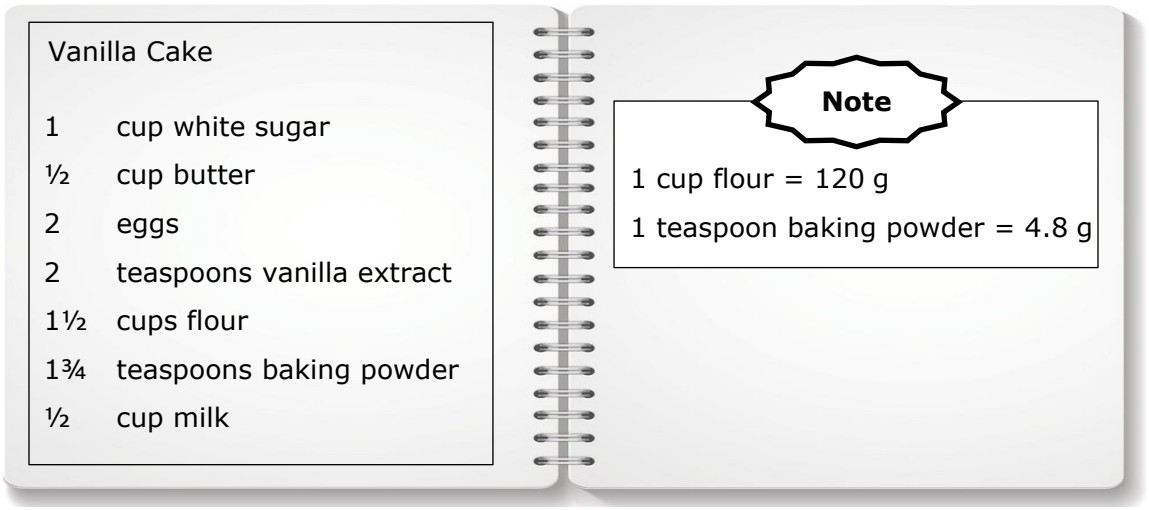
(3)

(b) Twelve workers can build a road in 120 days.
How many workers are needed to build the same road in 80 days?

(2)

(Total: 5 marks)

3 A baker uses the following ingredients to make a vanilla cake.



(Image adapted from: www.vectorstock.com)

(a) Write the ratio of the number of cups of butter to the number of cups of flour.
Give your answer in its simplest form.

(2)

(b) Use the note above to write the ratio by weight of baking powder to flour.
Give your answer in its simplest form.

(3)

(c) How many one-kilogram packets of flour are needed to bake 30 cakes?

(2)

(d) The bakery bakes 30 vanilla cakes daily, seven days a week.
Each cake costs the baker €6.25 to make. He sells the cakes at 20% profit.
How much profit does he make in a whole week if he sells all the vanilla cakes that he bakes?

(3)

(Total: 10 marks)

4 Spinner A has six sides and they are numbered 2, 3, 4, 5, 6, and 7.
Spinner B has four sides and they are numbered 2, 3, 4 and 5.
Each spinner is equally likely to stop on any of its numbers. The two spinners are spun once and the number on which each stops is recorded.

(a) Find the probability that:

(i) Spinner A stops on a number less than 4;

(1)

(ii) Spinner B stops on 7.

(1)

(b) Complete the possibility space below to show all the possible outcomes.

		Spinner A					
		2	3	4	5	6	7
Spinner B	2	(2, 2)	(3, 2)		(5, 2)		
	3			(4, 3)	(5, 3)		
	4				(5, 4)		(7, 4)
	5	(2, 5)		(4, 5)			

(2)

(c) Use your possibility space to find the probability that:

(i) both spinners stop on the same number.

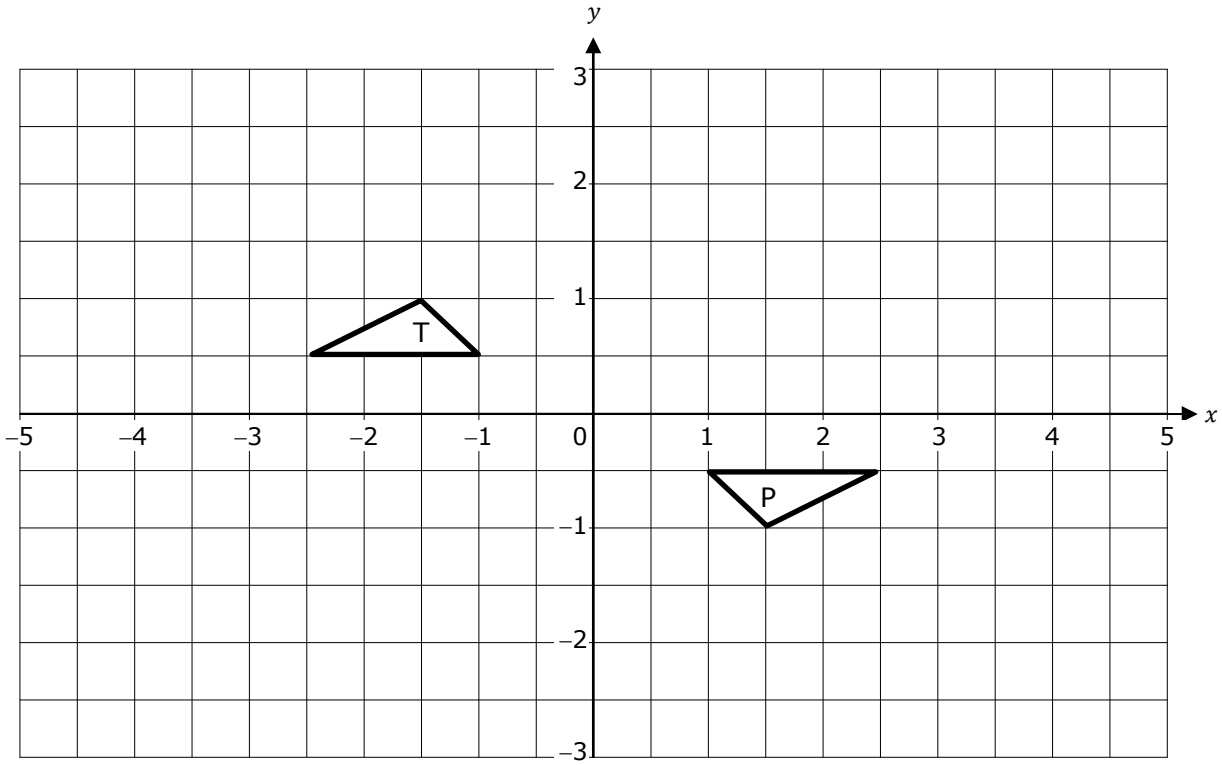
(2)

(ii) one spinner stops on a prime number and the other spinner stops on a number that is **not** prime.

(2)

(Total: 8 marks)

5



(a) Translate triangle T by vector $\begin{pmatrix} 1 \\ -2 \end{pmatrix}$. Label the image formed A.

(2)

(b) Reflect triangle T in the y-axis. Label the image formed B.

(2)

(c) Rotate triangle P, 90° anticlockwise about the point (2.5, −0.5).
Label the image formed C.

(2)

(d) Enlarge triangle T with scale factor 2 about (0,0). Label the image formed D.

(2)

(e) Describe the single transformation that maps triangle P to triangle T.

(2)

(Total: 10 marks)

6 (a) Work out the value of p, q, r and s in the diagram below.
Give reasons for your answers.

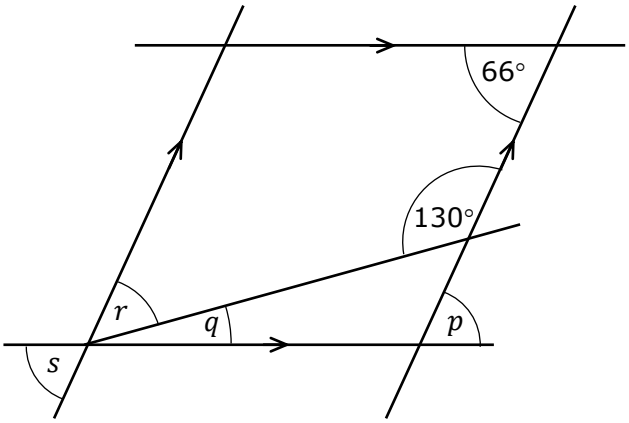


Diagram not drawn to scale

(8)

(b) Work out the value of x in the following pentagon.

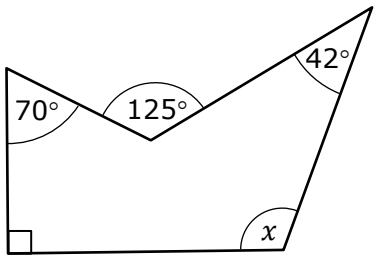
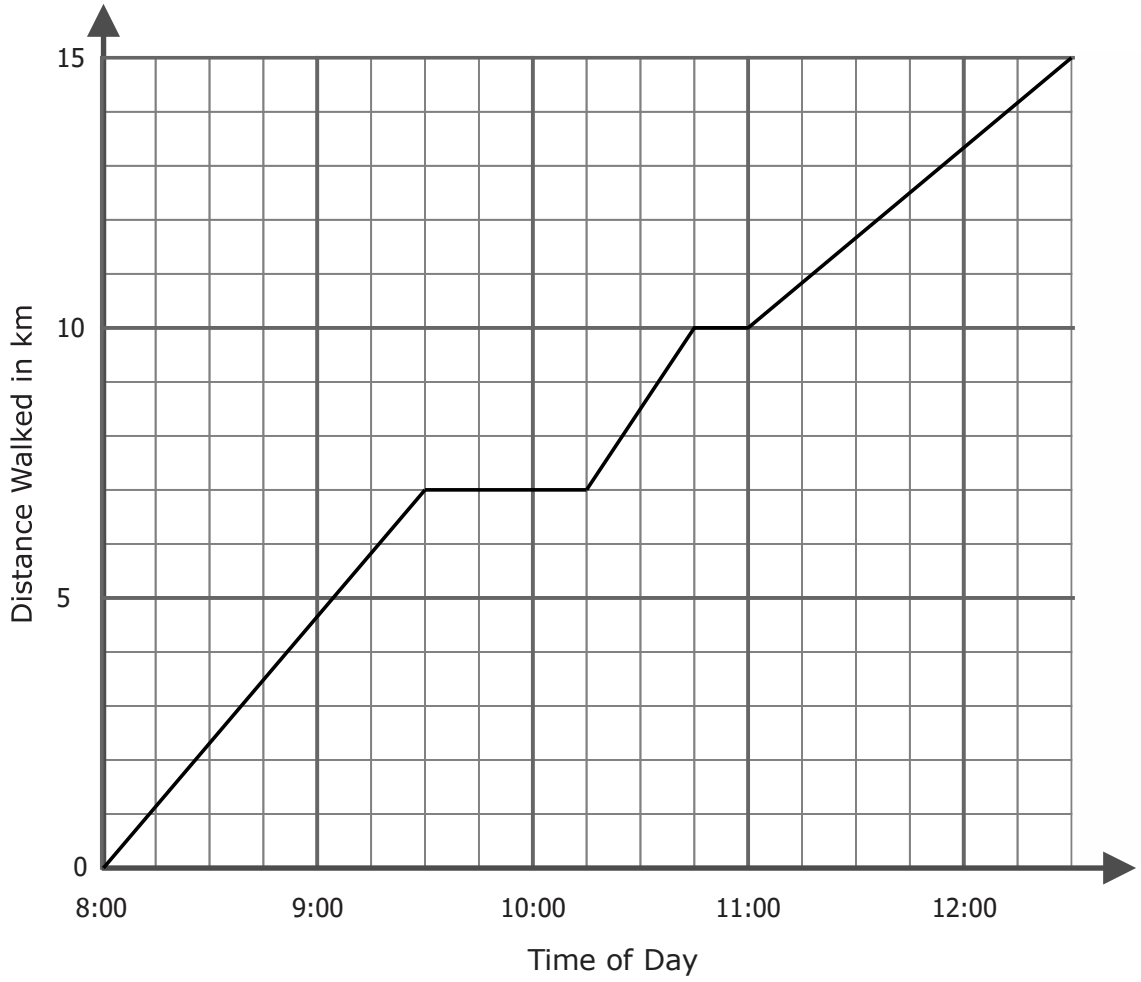


Diagram not drawn to scale

(3)

(Total: 11 marks)

7 One morning, Tania went out for a long walk. The graph shows the total distance covered at different times during her walk.



(a) What distance did Tania cover in her walk?

(1)

(b) How long did Tania's walk last? (1)

(c) During which time interval did Tania take her first break from walking?

(1)

(d) What was Tania's walking speed between 8:00 and 9:30?

(2)

(e) (i) During which time interval was Tania walking fastest?

(1)

(ii) What was her walking speed during this time?

(2)

(Total: 8 marks)

8 In a particular country, income tax is calculated as follows:

Amount	Tax Rate
Up to €9100	0%
Over €9100 up to €14 500	15%
Over €14 500 up to €60 000	25%
Over €60 000	35%

(a) Mattea earns €40 000 annually. Calculate the total income tax Mattea pays annually.

(4)

(b) Next year, Mattea will receive an increase.
The total tax she has to pay amounts to €9000.
If the tax rates remain the same, what will her new gross income be?

(4)

(Total: 8 marks)

9 Three hundred tickets were sold for a music festival.
Some of the tickets cost €52 whilst the others cost €35.
The total sum of money collected from the sale of tickets was €12 438.

(a) Write two equations to represent the above information.

(2)

(b) How many tickets of each type were sold?

(3)

(Total: 5 marks)

Please turn the page.

10 The façade of an apartment block and the façade of a house lie along straight line WXY. Point Z is on the same level ground, in line with WXY. The length of YZ is 15 m and the length of WZ is 32 m. The width of the house, XY, is 6 m. The angle of elevation of C, the top of the house, from Z is 30°. The angle of elevation of A, the top of the apartment block, from Z is 50°.

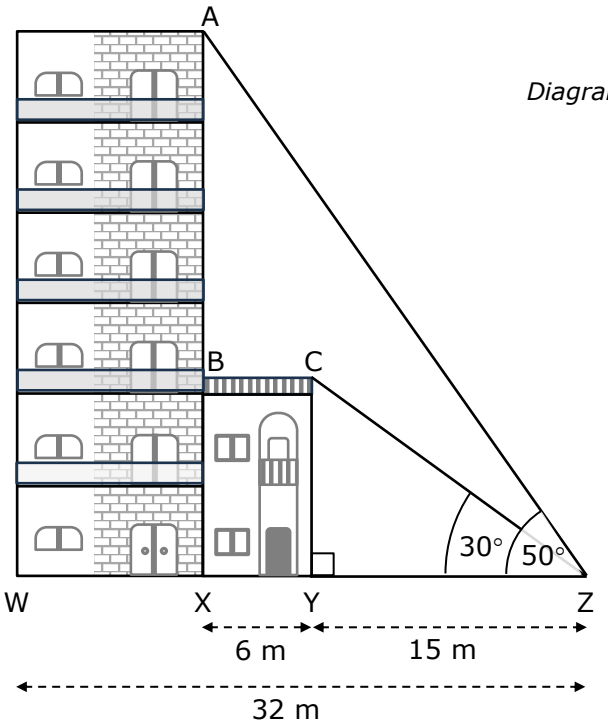


Diagram not drawn to scale

(a) Calculate the height of the house, CY.

(3)

(b) Calculate the height AB.

(3)

(c) Work out the angle of depression from A to C.
Give your answer correct to the nearest degree.

(2)

(Total: 8 marks)

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Index Number:_____ SEC23/2A.24m

L-Università ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

SECONDARY EDUCATION CERTIFICATE LEVEL
2024 MAIN SESSION

SUBJECT:	**Mathematics**
PAPER NUMBER:	IIA
DATE:	4th May 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.

Table of formulae

Area of triangle	$\frac{1}{2}ab\sin C$
Curved Surface Area of Right Circular Cone	πrl
Surface Area of a Sphere	$\pi r^2 4$
Volume of a Pyramid / Right Circular Cone	$\frac{1}{3}$ base area × perpendicular height
Volume of a Sphere	$\frac{4}{3}\pi r^3$
Solutions of the equation $ax^2 + bx + c = 0$	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Sine Formula	$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
Cosine Formula	$a^2 = b^2 + c^2 - 2bc\cos A$

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

1 (a) Jugs A and B are similar. Jug A has a capacity of 1.215 litres while jug B has a capacity of 2.88 litres. Jug A is 9 cm high.

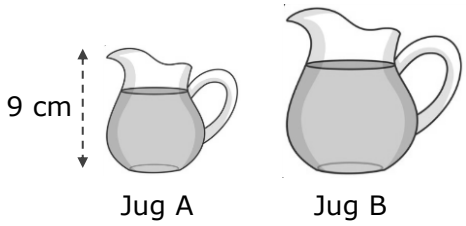


Diagram not drawn to scale *(Image adapted from: www.freepik.com)*

(i) Calculate the height of jug B.

(3)

(ii) The base area of jug B is 80 cm^2. Work out the base area of jug A.

(3)

(b) The flow rate, F cm^3/s, of water through a pipe is directly proportional to the square of the radius, r cm, of the pipe. A pipe of radius 0.95 cm has a flow rate of 50.54 cm^3/s.

(i) Find the equation connecting F and r.

(3)

(ii) Calculate r when F = 87.5 cm^3/s.

(2)

(Total: 11 marks)

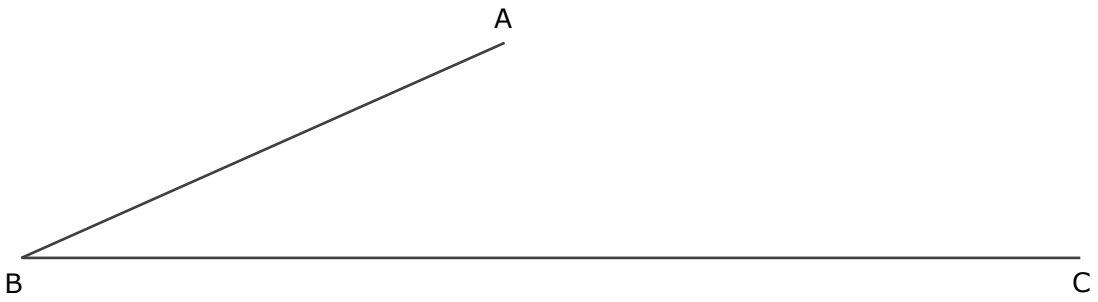
2 (a) On the diagram below, use ruler and compasses only to construct:

(i) the locus of points 4 cm from point A;

(1)

(ii) the locus of points equidistant from line segments AB and BC.

(2)



(b) (i) Label X and Y, the points where the two loci meet.

(1)

(ii) Measure XY.

(1)

(Total: 5 marks)

Please turn the page.

3 Before leaving for work, John picks two fruits at random from a fruit bowl containing seven apples, four oranges and one pear.

(a) Find the probability that the two fruits picked are:

(i) two apples;

(2)

(ii) an apple and a pear.

(3)

(b) If in one year John repeats this choice 264 times, use your answer to part (a)(i) to find the number of times he expects to pick two apples.

(2)

(Total: 7 marks)

4 (a) Make x the subject of the formula $c = \frac{a}{x}(x - b)$.

(3)

(b) Express $\dfrac{3x - x^2}{x^2 + 3x - 10} + \dfrac{x - 1}{x + 5}$ as a single fraction.

(4)

(c) A rectangular plot of land has an area of 92 m^2 and a perimeter of 39 m.
Let x be the length of the plot and y be its width.

(i) Write two equations that are satisfied by x and y.

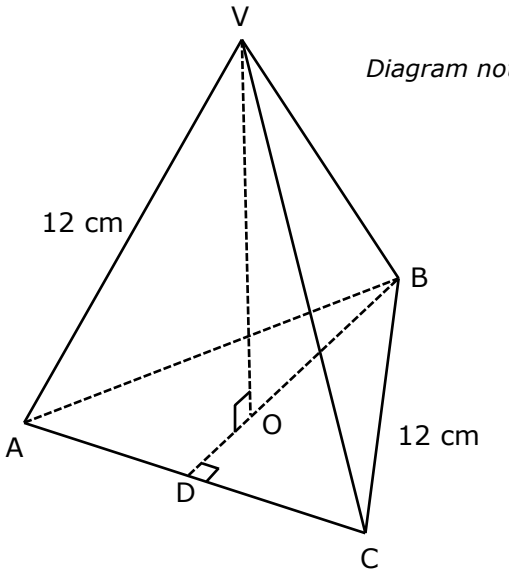
(2)

(ii) Solve the two equations for x and y.

(5)

(Total: 14 marks)

5 VABC is a right triangular based pyramid. All edges of this pyramid are of length 12 cm. Point O is on the base of the pyramid, directly below V. The midpoint of AC is D and $BO = \frac{2}{3}BD$.



(a) Show the length of BO = 6.928 cm, correct to three decimal places.

(2)

(b) All faces of the triangular based pyramid need to be painted.
Calculate the total surface area of the triangular based pyramid.

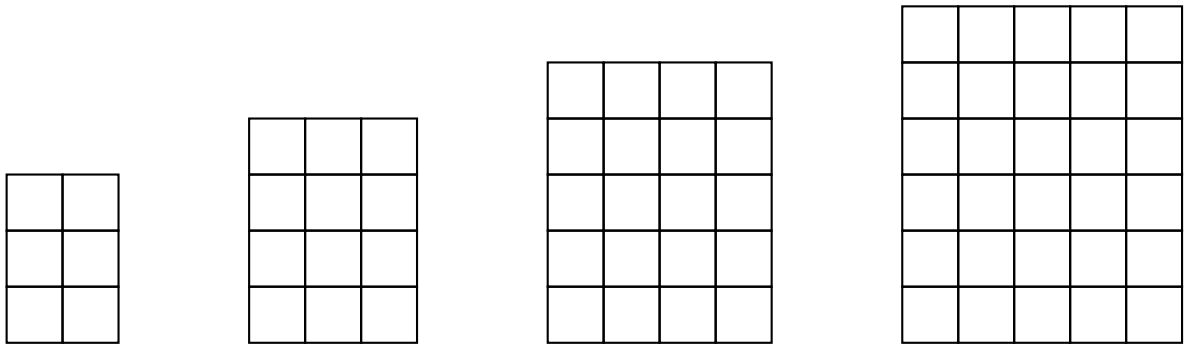
(3)

(c) Work out the volume of the triangular based pyramid.

(4)

(Total: 9 marks)

6 The shapes below are drawn in a pattern.



Shape 1 Shape 2 Shape 3 Shape 4

(a) Complete the table below.

Shape Number	1	2	3	4	5	6	n
Number of tiles	6	12	20	30			

(3)

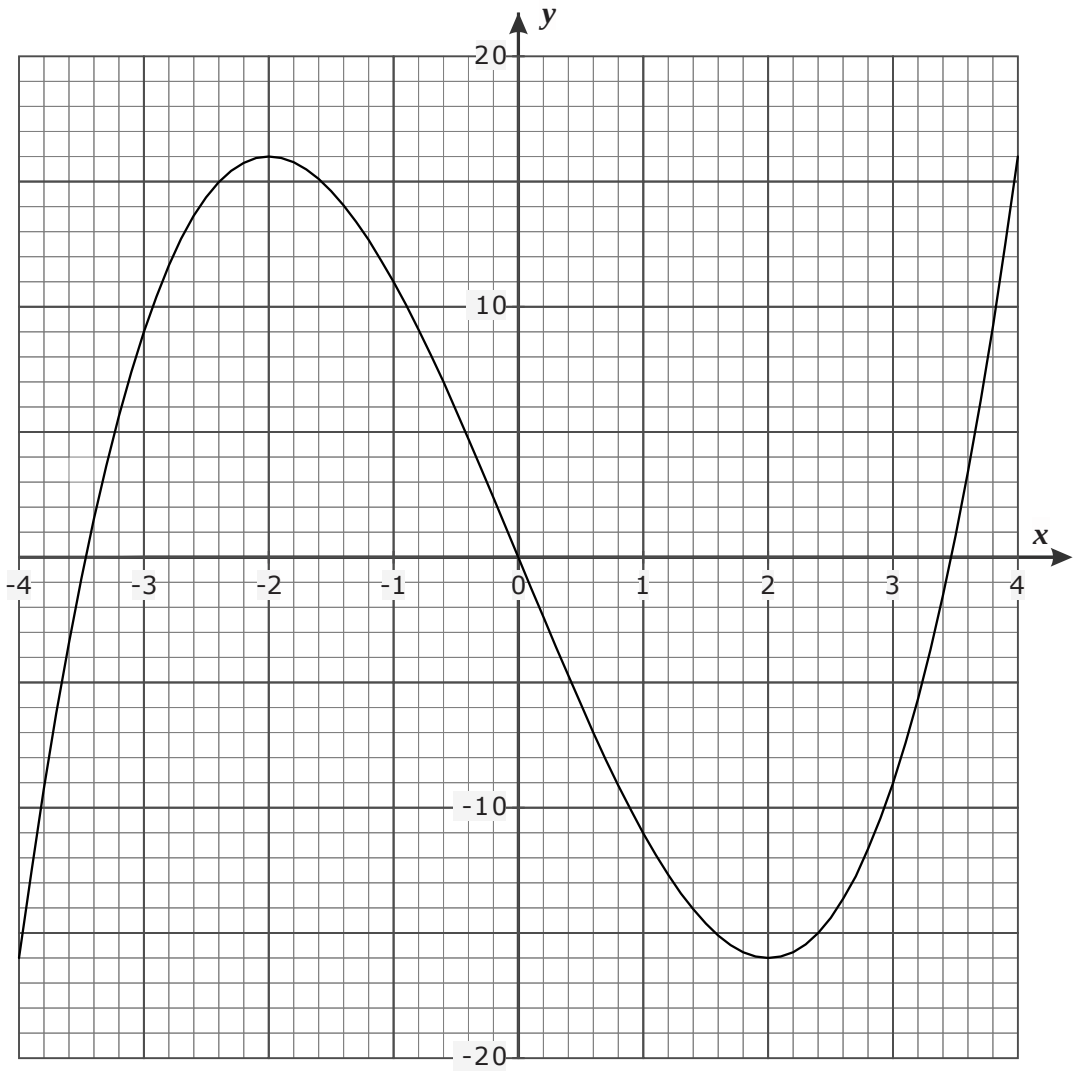
(b) Shape n has 10 302 tiles. Find the value of n.

(4)

(Total: 7 marks)

Please turn the page.

7 The following is a plot of the graph of $y = x^3 - 12x$.



(a) On the same axes, plot the graph of $y = \frac{-7}{2}x - 4$.

(3)

(b) Show that the equation $2x^3 - 17x + 8 = 0$ is satisfied at the points of intersection of the two graphs.

(2)

(c) Use your graph to estimate the solutions of the equation $2x^3 - 17x + 8 = 0$.

(3)

(d) Use the trial and improvement method to determine the value of the largest solution of the equation $2x^3 - 17x + 8 = 0$, correct to two decimal places.
Show your working.

(3)

(Total: 11 marks)

Please turn the page.

8 (a) Andrew invested €12 000 at 3.5% compound interest for nine years.
How much interest did he gain?

(3)

(b) Andrew invested another sum of money in a private investment scheme.
During the first year the investment dropped by 8%, in the second year it dropped by 3% and in the third year rose by 6%.

(i) What is the overall percentage change?

(3)

(ii) What percentage change, correct to one decimal place, is needed to regain the original value of the sum invested?

(2)

(Total: 8 marks)

9 The Local Council needs to build a fence around a children's playing field. The rectangular playing field measures 64 m by 35 m correct to the nearest metre.

(a) What are the lower and upper bounds of the length and width of the playing field?

(2)

(b) What are the lower and upper bounds for the total length of the fence?

(3)

(c) The Local Council will buy fence pieces to enclose the playing field. Fence pieces are only sold in lengths of 70 cm, correct to the nearest centimetre. The council wants to make sure that just enough fence pieces are bought. Use your answer in part (b) to find the number of fence pieces that are needed.

(3)

(Total: 8 marks)

Please turn the page.

10 The table shows the distribution of marks, x, of a Maths test, of 280 students.

Mark (x)	Frequency
$0 < x \leq 10$	12
$10 < x \leq 20$	32
$20 < x \leq 30$	40
$30 < x \leq 40$	56
$40 < x \leq 50$	28
$50 < x \leq 60$	44
$60 < x \leq 70$	28
$70 < x \leq 80$	20
$80 < x \leq 90$	16
$90 < x \leq 100$	4

(a) Complete this cumulative frequency table.

Mark (x)	Cumulative Frequency
$x \leq 10$	12
$x \leq 20$	
$x \leq 30$	
$x \leq 40$	
$x \leq 50$	
$x \leq 60$	
$x \leq 70$	
$x \leq 80$	
$x \leq 90$	
$x \leq 100$	280

(2)

(b) Use the grid on the opposite page to draw the cumulative frequency graph. Label your axes.

(3)

(c) Use your graph to find an estimate of:

(i) the median; (1)

(ii) the interquartile range.

(2)

(d) 35% of the students passed the maths test. Use your graph to find an estimate for the minimum mark needed to pass the Maths test.

(2)

(Total: 10 marks)

11 A yacht starts sailing from point P at a bearing of 040°. It reaches buoy Q which is 3.5 km from P. It then sails on a bearing of 305° for a further 5 km to point R.

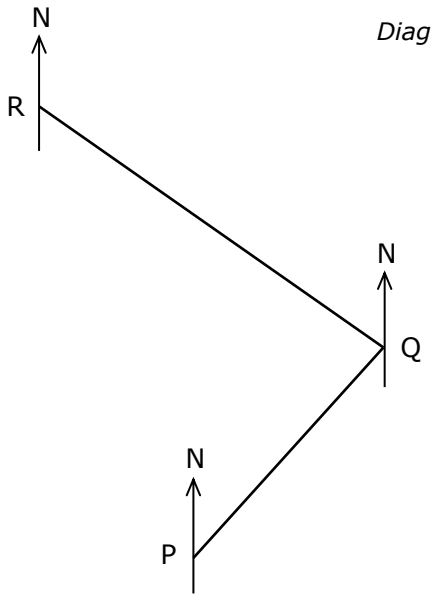


Diagram not drawn to scale

(a) What is the bearing of P from Q?

(2)

(b) Calculate the size of ∠PQR.

(2)

(c) Work out the distance PR, giving your answer correct to two decimal places.

(3)

(d) Calculate the size of ∠PRQ.

(3)

(Total: 10 marks)

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MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

SECONDARY EDUCATION CERTIFICATE LEVEL
2024 MAIN SESSION

SUBJECT:	**Mathematics**
PAPER NUMBER:	IIB
DATE:	4th May 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) Rearrange the following set of numbers starting from the smallest.

21.05, 2.015, 0.2015, 20.51, 2.105

_____ , _____, _____, _____, _____

(2)

(b) Work out: $18 - 3 \times 4 + 14 \div 2$

(2)

(Total: 4 marks)

2 Write:

(a) A prime number between 30 and 40;

(1)

(b) The largest common factor of 24 and 32;

(1)

(c) A square number greater than 40 but less than 80.

(1)

(d) A multiple of 12 between 40 and 50.

(1)

(Total: 4 marks)

3 Underline the correct answer:

(a) The length of a football pitch is: 10 km, 1000 cm, 10 000 mm, 100 m

(1)

(b) The mass of a new born baby: 30 g, 10 kg, 3000 g, 0.125 kg

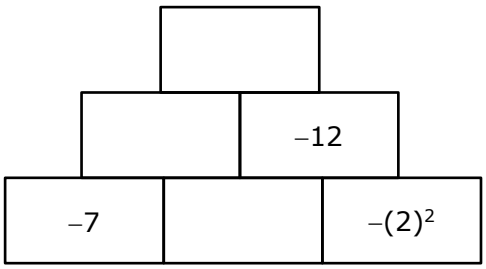
(1)

(c) The capacity of a tea cup: 1.5 litres, 150 ml, 500 ml, 1.5 cc

(1)

(Total: 3 marks)

4 The number in each block is found by multiplying the two numbers below it.
Fill in the missing numbers.



(Total: 3 marks)

5 (a) Round each number to one significant figure to find an estimate for $\frac{\sqrt{5.8 \times \pi + 7.1}}{4.6^2}$.

(2)

(b) Use your calculator to work out $\frac{\sqrt{5.8 \times \pi + 7.1}}{4.6^2}$, giving your answer to 2 decimal places.

(2)

(Total: 4 marks)

6 (a) The distance between Malta and the UK by plane is 2552 km.
Write 2552 km in standard form.

(1)

(b) A paper is 5×10^{-2} mm thick.
Write 5×10^{-2} mm as an ordinary number.

(1)

(c) The area of Lake Garda is 370 km^2. The area of Lake Como is 146 000 km^2.
Find the difference between the areas of these two lakes.
Give your answer in standard form correct to 2 significant figures.

(2)

(Total: 4 marks)

7 The angles of a quadrilateral are $(2p - 35)$, $(p + 20)$, $3p$ and $(p + 95)$.

(a) Work out the value of p.

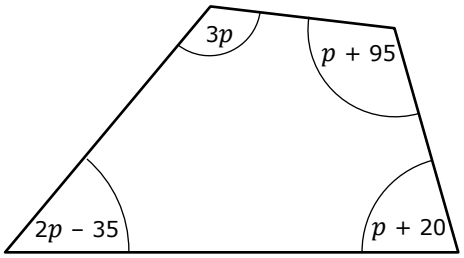


Diagram not drawn to scale

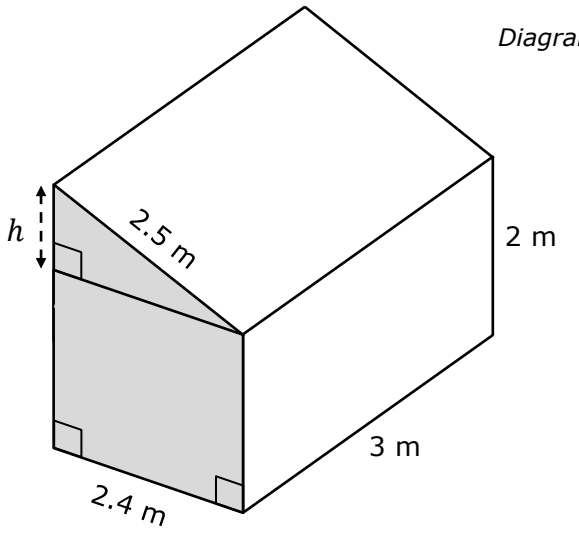
(3)

(b) Marina states that this quadrilateral is a cyclic quadrilateral.
Is Marina correct? Show your reasoning.

(2)

(Total: 5 marks)

8 The diagram below shows a greenhouse in the shape of a prism.



(a) Show that h = 0.7 m.

(2)

(b) Calculate the area of the shaded face of the greenhouse.

(2)

(c) Work out the volume of air in the greenhouse. Give your answer in cubic metres.

(2)

(Total: 6 marks)

9 Lora earns €240 from a part-time job.

(a) She spends $\frac{3}{8}$ of her money on outings. How much money is left?

(2)

(b) Lora donates €30 to a charity organisation from the money she has left.
What fraction of the money left does Lora donate? Simplify your answer.

(1)

(c) Lora saves the remainder of her money. What fraction of the money earned does she save?

(2)

(Total: 5 marks)

10 The table below shows two sequences, Sequence A and Sequence B.

Term Number	1	2	3	4	5	6	100	n
Sequence A	1	4	9	16	25			
Sequence B	21	24	29	36	45			

(a) How can you obtain the terms of Sequence B from those of Sequence A?

(1)

(b) Fill in the empty cells to complete the table above.

(4)

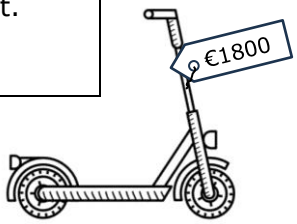
(c) Consider Sequence A.
For what value of n does the term in the sequence take the value of 900?

(1)

(Total: 6 marks)

11 A shop offers two deals to promote an electric scooter model marked €1800.

Offer A	Offer B
A deposit of €500 and twelve monthly payments of €120 each.	15% discount on full payment.



(Image adapted from: alamy.com)

(a) Which is the cheaper offer and by how much? Show your working.

(5)

(b) Louisa chooses Offer A.
What percentage increase on the marked price will Louisa have to pay?
Give your answer correct to one decimal place.

(2)

(Total: 7 marks)

Please turn the page.

12 Use ruler and compasses only to construct the following.
Point B has already been marked for you.

(a) At B, construct a line 11 cm long. Label your line BD.

(1)

(b) On line BD, mark the point C such that BC = 7 cm.

(1)

(c) Construct an angle of 60° at B.

(2)

(d) Construct an angle of 90° at C.

(2)

(e) Let the lines constructed in (c) and (d) meet at point A. Join line AD.
Measure angle ADB.

(1)

B

(Total: 7 marks)

13 A flower bed has the shape of a circle of radius 1.3 m.

(a) What is the area of the flower bed?

(2)

A layer of soil, 0.15 m thick, is used for the flower bed.

(b) Work out the volume of the soil used.

(2)

(Total: 4 marks)

14 A teacher performs an experiment with her class. She buys each of her 18 students a packet of raisins. Each student counts the number of raisins in their packet.
Here is the data collected.

28	29	28	30	28	28	29	27	29
29	30	29	28	27	27	30	28	30

(a) Complete the frequency table for the above data.

Number of raisins	Frequency
27	3
28	
29	
30	

(2)

(b) Write the modal number of raisins in the packets.

(1)

(c) Work out the mean number of raisins in the packets.

(2)

(d) One of the 18 students is chosen at random.
What is the probability that the student has a packet with 29 raisins?

(1)

(Total: 6 marks)

15 Beppe travels 136 km by car from Rome to Perugia. He leaves Rome at 08:40 and arrives in Perugia at 11:10.

(a) Calculate Beppe's average speed for the journey.

(3)

Beppe stops at Perugia for 4.5 hours and then travels to Pisa 174 km away. He increases his average speed by 3.6 km/h for this part of the journey.

(b) At what time does he arrive in Pisa?

(3)

(Total: 6 marks)

16 Three brothers Anglu, Bertu and Carlo inherit a sum of €35 000.
They are to share it so that Anglu gets the largest amount.
Bertu gets €3000 less than Anglu and Carlo gets €6700 less than Anglu.

Work out how much each brother gets.

(Total: 4 marks)

17 Members of Fitform Gym were asked to state their preferred time for going to the gym.
A total of 144 members took part in the survey.
The number of members and their preferred time is shown in the table below.

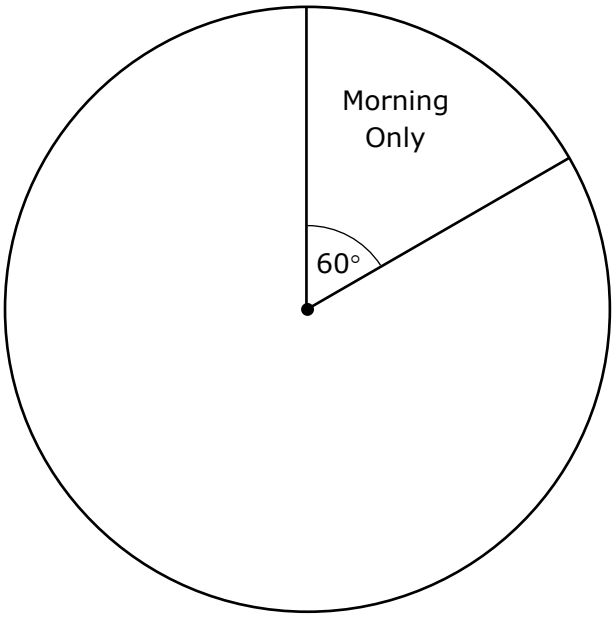
Preferred Time	Frequency
Morning only	24
Afternoon only	42
Evening only	48
Different times	30

The manager of Fitform Gym wants to draw a pie chart to show the information in the table.

(a) Show that the angle for the sector representing the members preferring morning only is 60°.

(1)

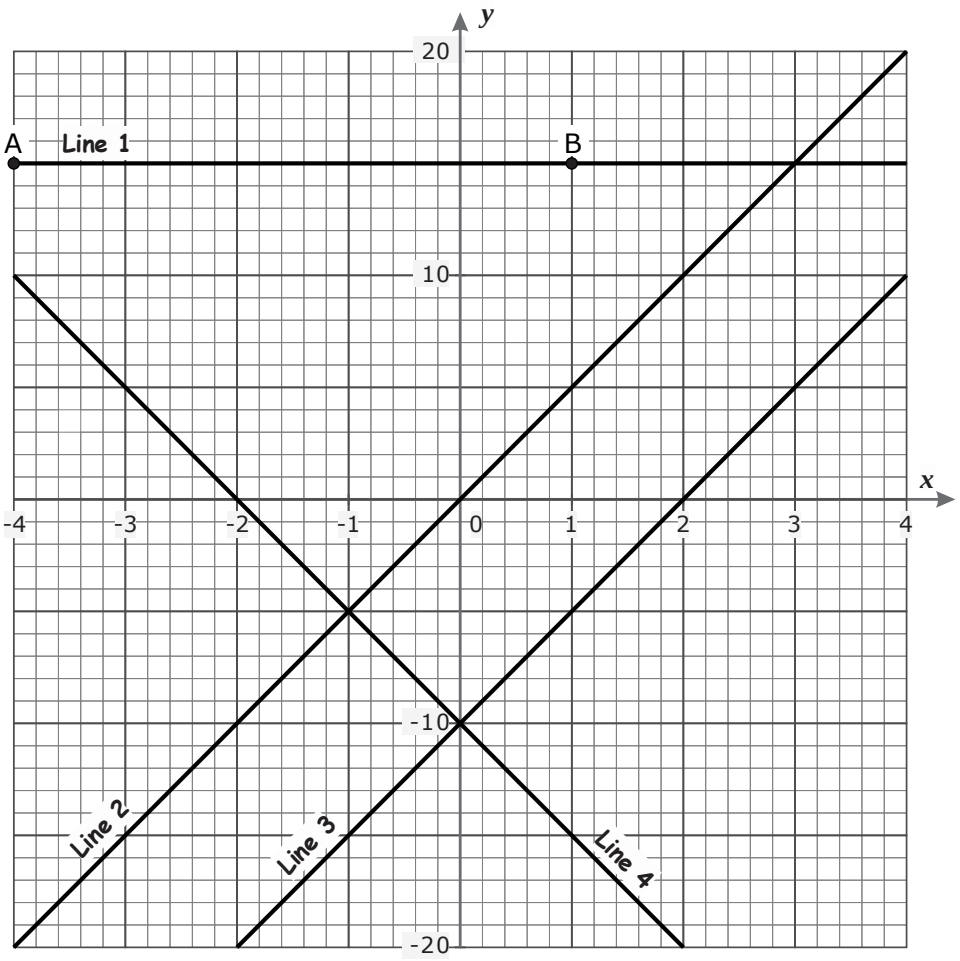
(b) Complete and label the pie chart to show the information in the table.



(3)

(Total: 4 marks)

18 Use the graphs below to answer the following questions.



(a) Use the graph to find the coordinates of points A and B on Line 1. (1)

(b) What is the equation of Line 1?

(1)

(c) Name the coordinates of two points on Line 2 and show that these two points satisfy the equation $y = 5x$.

(2)

(d) Work out the equation of Line 3.

(1)

(e) Work out the equation of Line 4.

(1)

(Total: 6 marks)

19 The diagram below shows a parallelogram ABCD. Line XYZ intersects sides AD and BC at X and Z respectively, and it cuts diagonal AC at Y. Line XYZ is parallel to sides AB and CD of the parallelogram.

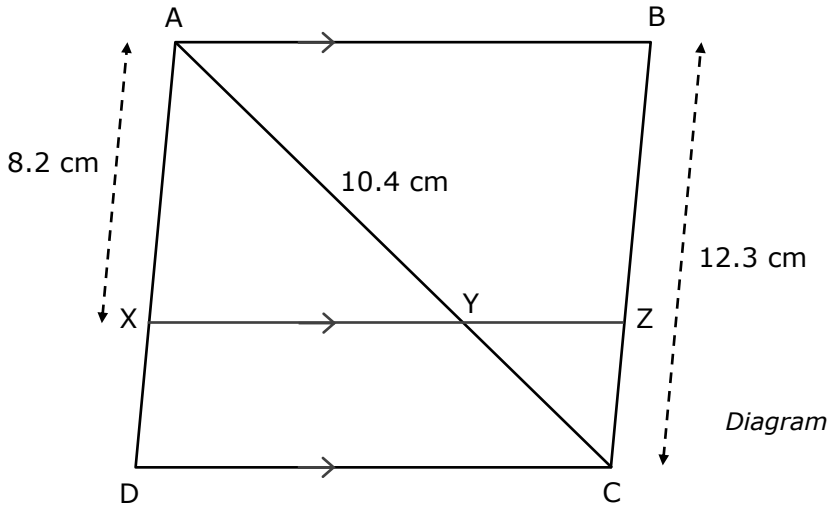


Diagram not drawn to scale

(a) Show that triangle AXY is similar to triangle ADC.

(3)

(b) If AX = 8.2 cm, AY = 10.4 cm, and BC = 12.3 cm, work out the length of YC.

(3)

(Total: 6 marks)

20 The points A, B, C and D lie on the circumference of a circle centre O.
AC is a diameter of the circle and ∠BDA = 38°.

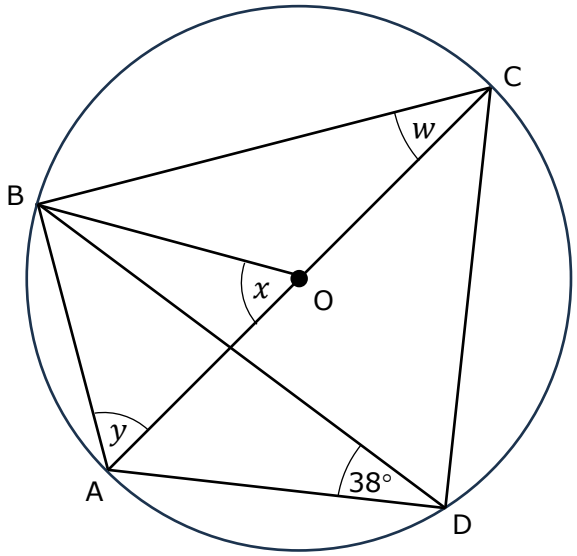


Diagram not drawn to scale

Work out the size of angles w, x, and y. Give reasons for your answer.

(Total: 6 marks)

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