



L-Università
ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE
EXAMINATIONS BOARD

**SECONDARY EDUCATION CERTIFICATE LEVEL
2021 MAIN SESSION**

SUBJECT: **Mathematics**
 PAPER NUMBER: I – Section B (Calculator Section)
 DATE: 12th June 2021
 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.

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Sec A	1	2	3	4	5	6	7	8	9	10	11	Total

-
- 1 (a) Fill in the blanks:
- (i) $4.3 \text{ m} = \underline{\hspace{2cm}} \text{ mm}$
- (ii) $60 \text{ hours} = \underline{\hspace{2cm}} \text{ days}$
- (iii) When written in standard form, $3\,500\,000 = \underline{\hspace{2cm}}$
- (iv) A prime number between 15 and 20 is $\underline{\hspace{2cm}}$ (4)

- (b) Frank has a festoon which he lights up for the village festa. The festoon has white and blue bulbs in the ratio 3:5. It has 45 white bulbs. This year, he wants to change the ratio of white and blue bulbs in the festoon to the ratio of 1:3. He will keep the same total number of bulbs in his festoon. How many **more** blue bulbs will there be in this year's festoon?

(4)

(Total: 8 marks)

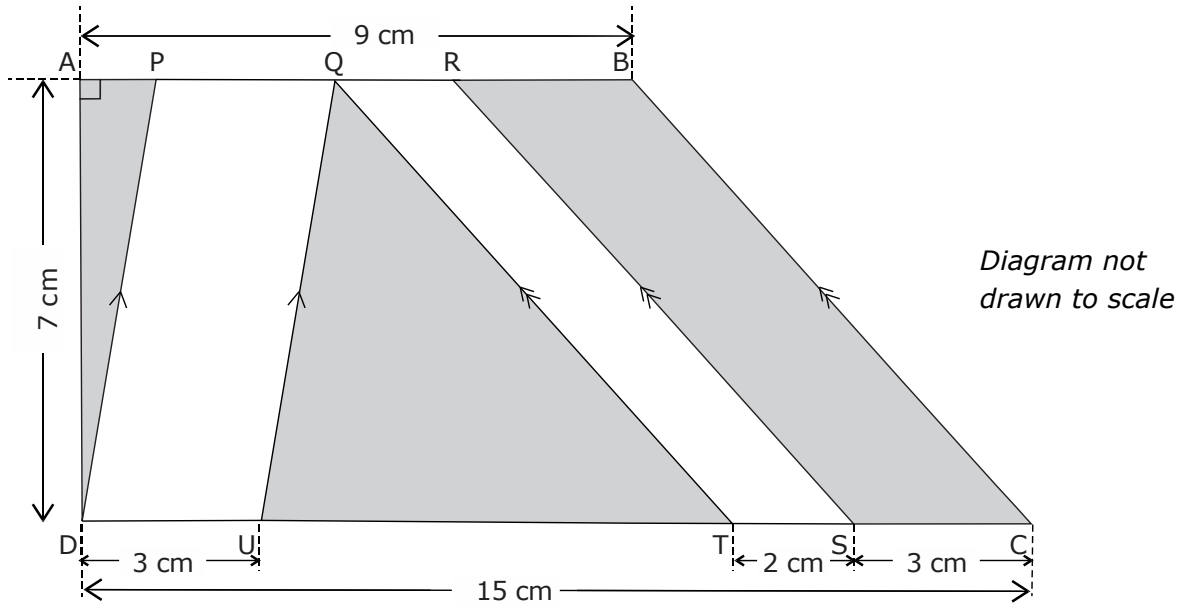
-
- 2 (a) Write your answers in the spaces provided.
- (i) Choose an even number N. $\underline{\hspace{2cm}}$
- (ii) Multiply your value of N by 4. $\underline{\hspace{2cm}}$
- (iii) Divide your value of N by 2. $\underline{\hspace{2cm}}$
- (iv) Subtract your answer to (iii) from your answer to (ii). $\underline{\hspace{2cm}}$
- (b) Your answer to step (iv) should be divisible by 7. This result is true for any even number N. Use algebra to explain why this is true.

(2)

(3)

(Total: 5 marks)

3



ABCD is a trapezium with AB parallel to CD and with $\angle DAB$ equal to 90° .

Use the diagram to answer the following questions:

(a) Explain why PQ is 3 cm long and QR is 2 cm long.

(2)

(b) Work out the length of PD.

(3)

(c) Work out the total area of the shaded parts.

(4)

(Total: 9 marks)

-
- 4 Alan is making cakes for a cake sale.
Each cake is made using the following ingredients:

INGREDIENTS

350 g flour
115 g butter
350 g sugar
4 lemons
4 eggs
80 ml milk

Alan has the following supplies in his kitchen:

3 kg flour
750 g butter
5 kg sugar
30 lemons
30 eggs
2 litres milk

- (a) What is the largest number of cakes that he can possibly make with these supplies?
Show your working clearly.

- (b) How much milk is left over after Alan makes the largest number of cakes he could
with his supplies? (3)

(2)

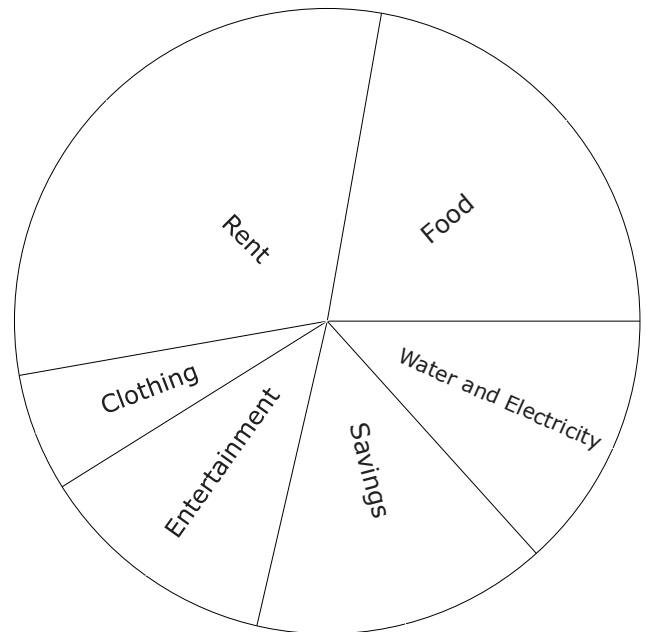
(Total: 5 marks)

- 5 (a) The following pie chart represents a breakdown of Peter's income in March. His income for this month was €2160.

- (i) Measure the angles representing:

Food: _____

Rent: _____



- (ii) What amount did Peter spend on Food in March? (2)

- (iii) What percentage of his income did Peter spend on Rent in March? (2)

- (b) The table shows information about the number of cars sold monthly by two companies during the Year 2020. (2)

Monthly Sales of Cars in 2020		
	Mean (cars per month)	Median (cars per month)
Company A	35.5	40
Company B	39.25	39

- (i) Which company sold more cars in 2020?

- (ii) Find the difference in the total number of cars sold by the two companies in 2020. (1)

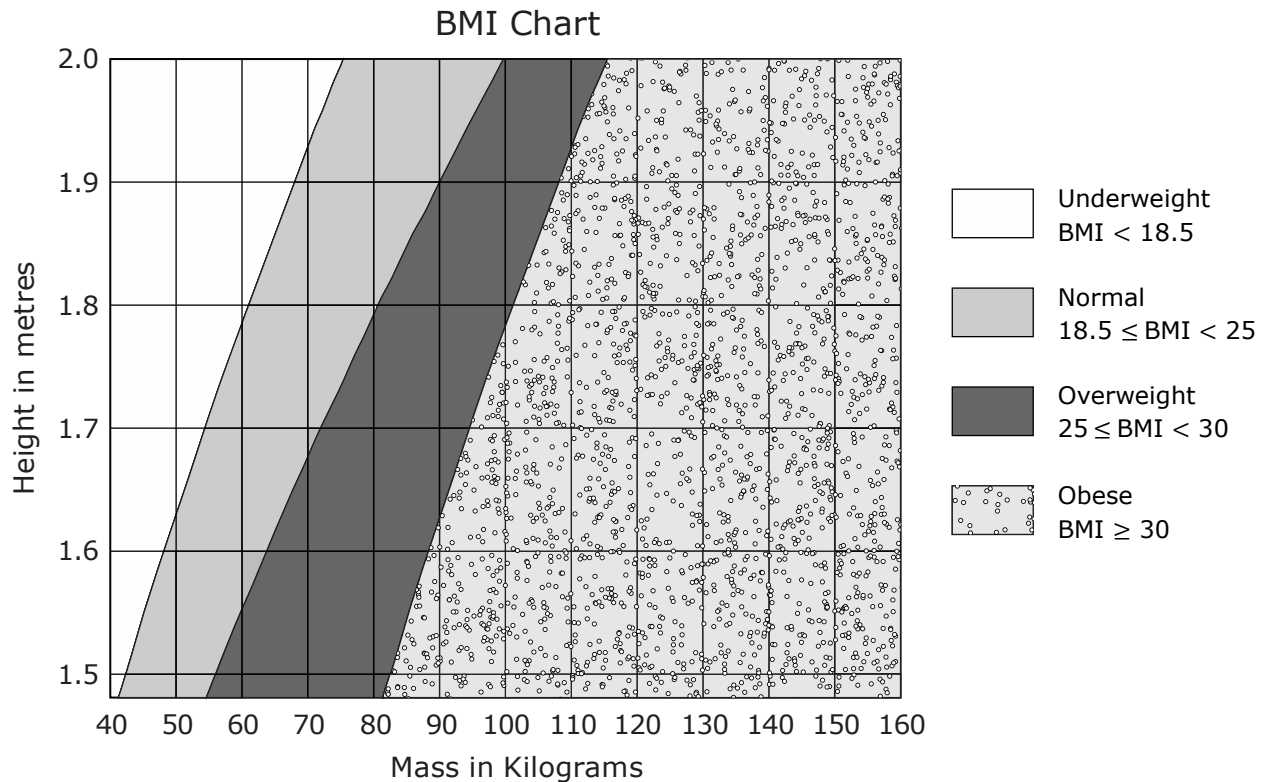
(3)

(Total: 10 marks)

- 6 Dieticians consider a number of factors when they advise their clients on weight management. One factor is the Body Mass Index (BMI).

The person's BMI depends on one's height and mass.

The BMI chart below shows how adults are classified into four categories (underweight, normal, overweight and obese) according to their mass and height.



- (a) In which category would a person of mass 85 kg and height of 1.75 m be?

(1)

- (b) Pamela is 1.6 m tall. Give an example of a mass which would put Pamela in the normal range category.

(1)

- (c) Thomas weighs 60 kg and has a BMI of less than 18.5. Give an example of what his height could be.

(1)

The formula used to calculate BMI is given by $BMI = \frac{m}{h^2}$,

where m is the mass in kg, and h is the height in metres.

- (d) (i) Use this formula to calculate the BMI of a person who weighs 97.3 kg and is 1.66 m tall.

(2)

- (ii) In which category is this person?

(1)

- (e) Find the exact height of a person who weighs 108 kg and has a BMI of $33\frac{1}{3}$ kg/m².

(3)

(Total: 9 marks)

- 7 A school has only two year groups; Year I and Year II.

- $\frac{2}{3}$ of the students in the school are in Year I.
- $\frac{4}{5}$ of the students in Year I have Internet access at home.
- $\frac{1}{10}$ of the students in Year II do not have Internet access at home.

What fraction of students in the whole school have Internet access at home?

(Total: 4 marks)

- 8 The table below shows the match results obtained by three teams in the Italian football Serie A during the season 2014 – 15.

Team	Played	Won	Drawn	Lost	Points
Juventus	38	26	9	3	87
Roma	38	w	d	6	70
Lazio	38	21	6	11	69

Let w and d be the number of matches won and drawn respectively by Roma.

- (a) Write down an equation, in terms of w and d , for the total number of matches played by Roma.

(1)

Teams gain points as follows:

- 3 points for winning a match;
- 1 point for getting a draw;
- 0 points for losing a match.

- (b) Write down an equation, in terms of w and d , for the total number of points obtained by Roma.

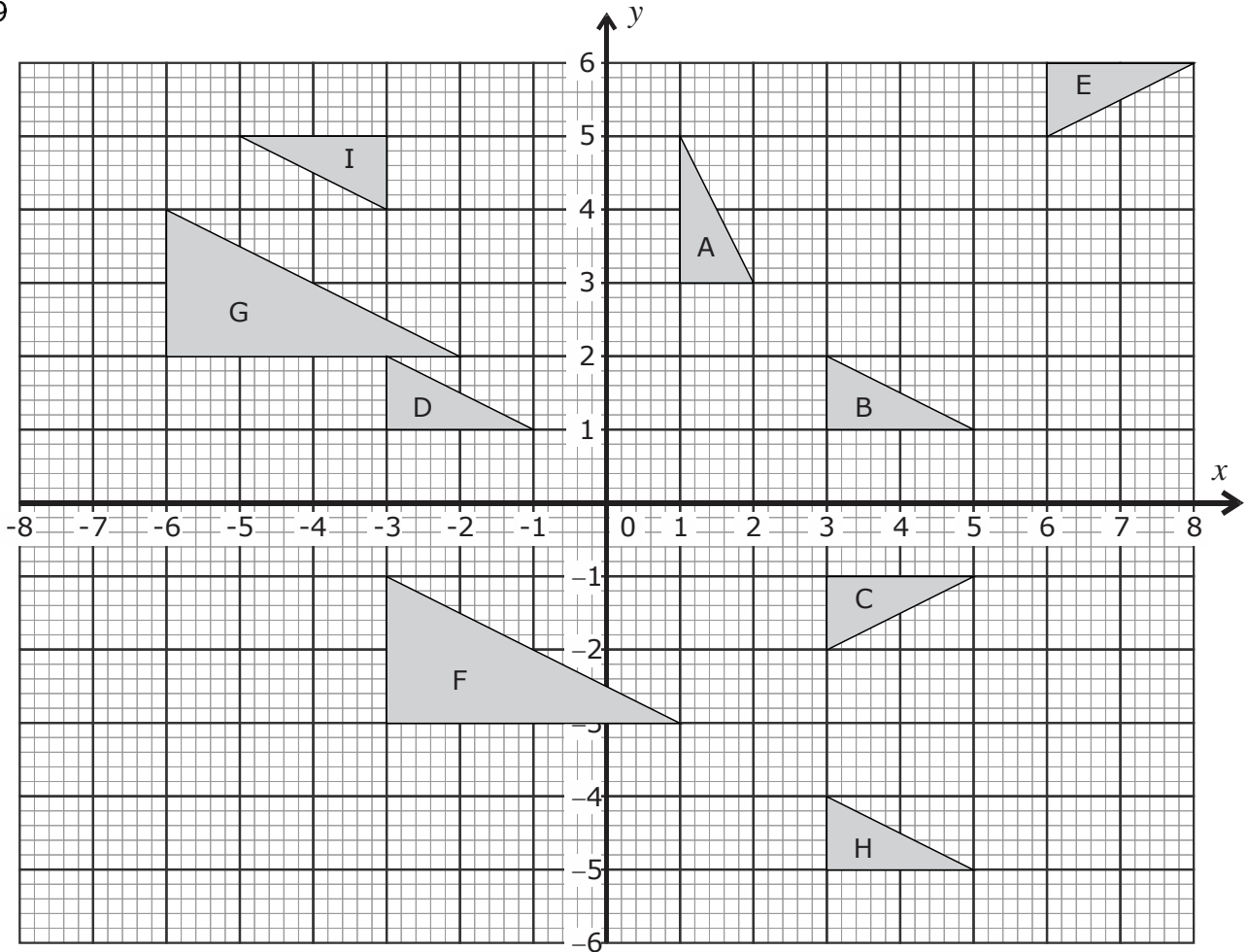
(2)

- (c) Use these two equations to find the number of matches in this season where Roma:
- (i) won the game;
 - (ii) finished draw.

(3)

(Total: 6 marks)

9



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

Object	Transformation	Image	
A	Rotation by 90° clockwise about $(0, 0)$		(1)
D	Enlargement by scale factor of 2 about the origin		(1)
	Reflection in the line $y = x$	B	(1)
	Translation by $\begin{pmatrix} -3 \\ -7 \end{pmatrix}$	C	(1)
	Reflection in the line $y = -3$	H	(1)
H		I	(2)
G		F	(2)

(Total: 9 marks)

10 A clothes shop is offering the following discounts:

- 25% off the total price on purchasing 2 items
- 30% off the total price on purchasing 3 or more items

Anna and Beth are shopping together at this shop.

Anna chooses a coat costing €85 and a pair of jeans costing €45.

Beth chooses a blouse costing €32 and a dress costing €74.

(a) How much money would Anna save if she were to buy the two items she chose?

(b) Anna and Beth decide to put the four items they chose together and pay in one bill. How much will Anna and Beth pay for these four items? (3)

(c) Anna pays the bill for the four items. Beth is going to pay Anna for her two items. Work out the amount that Beth needs to pay Anna for her two items. (3)

(2)

(Total: 8 marks)

- 11 In the diagram below, GCD , DEF and BCE are straight lines.
 AB is parallel to DG , AC is parallel to DF and BE is parallel to GF .

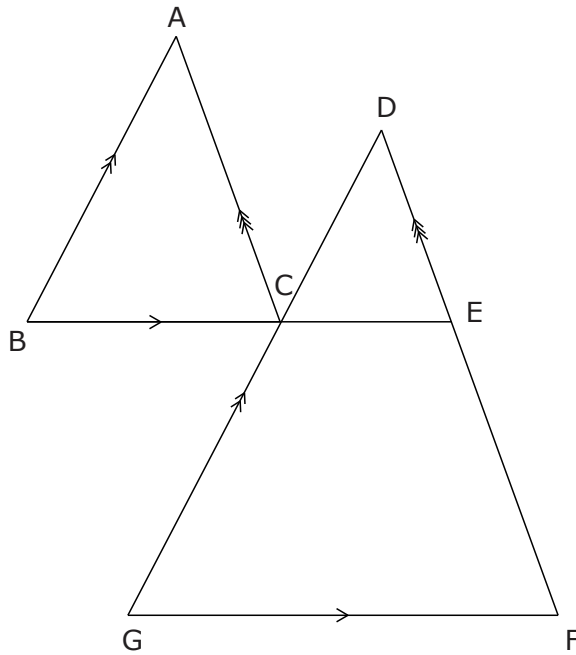


Diagram not drawn to scale

(a) Give a reason why:

(i) $\angle ABE = \angle DCE$ _____

(ii) $\angle DCE = \angle DGF$ _____

(b) Name **TWO** other angles equal to $\angle DFG$.

(2)

(c) Find the length of BC when $AB = 42$ cm, $CD = 27$ cm, $CG = 43$ cm and $GF = 56$ cm.

(2)

(3)

(Total: 7 marks)

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**SECONDARY EDUCATION CERTIFICATE LEVEL
2021 MAIN SESSION**

SUBJECT: **Mathematics**
DATE: 12th June 2021

PAPER: I – Section A (Non-Calculator Section)
TIME: 20 minutes

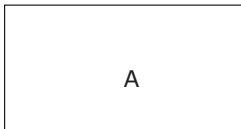
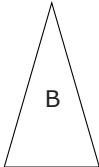
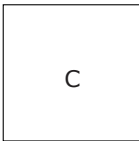
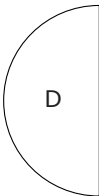
Attempt **ALL** questions.

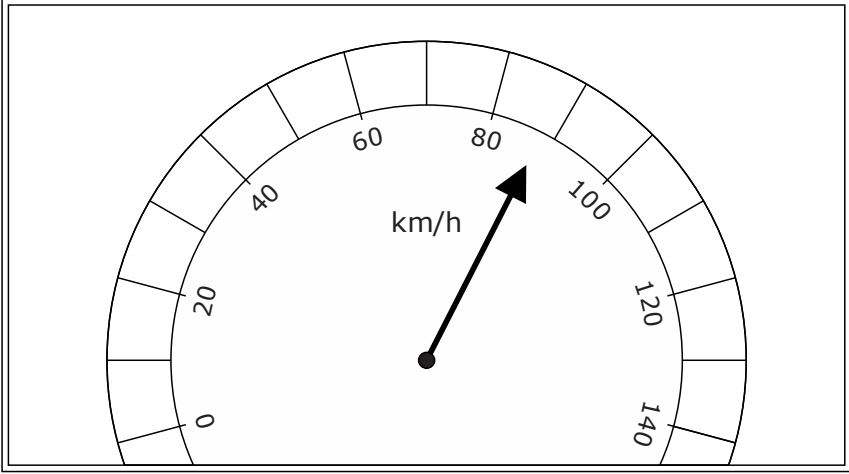
Write your answers in the space available on the examination paper.

The use of calculators and protractors is **not** allowed.

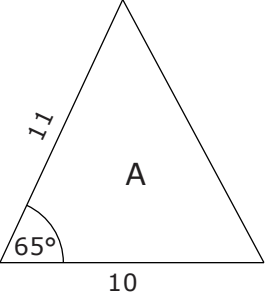
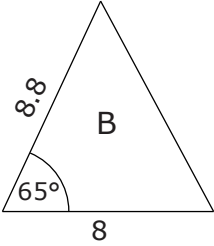
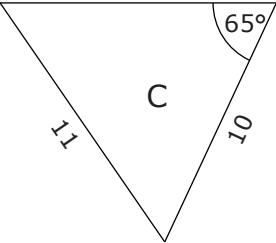
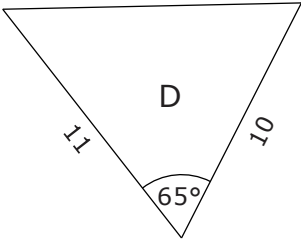
It is not necessary to show your working.

This paper carries a total of 20 marks.

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
<p>1</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  A </div> <div style="text-align: center;">  B </div> <div style="text-align: center;">  C </div> <div style="text-align: center;">  D </div> </div> <p>List the letter of the shape/s that have exactly one line of reflective symmetry.</p> <p style="text-align: center;">Ans _____</p>	
<p>2 A television programme starts at twenty minutes to ten. It lasts for half an hour. What time does it finish?</p> <p style="text-align: center;">Ans _____</p>	
<p>3 What is the volume of a cube with sides $\frac{1}{2}$ m long?</p> <p style="text-align: center;">Ans _____</p>	
<p>4 Simplify: $(a + b) - (a - b)$</p> <p style="text-align: center;">Ans _____</p>	
<p>5 Work out: $(63 \times 80) + (7 \times 80)$</p> <p style="text-align: center;">Ans _____</p>	

<p style="text-align: center;">QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK</p>	<p style="text-align: center;">SPACE FOR ROUGH WORK (IF NECESSARY)</p>
<p>6 The area of a triangle is 50 cm^2. Its base is 8 cm long. What is its height?</p> <p style="text-align: right;">Ans _____</p>	
<p>7 The figure shows a speedometer. Estimate, as accurately as possible, the speed shown.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">Ans _____</p>	
<p>8 Write the value of 3.87456 km correct to the nearest metre.</p> <p style="text-align: right;">Ans _____</p>	
<p>9 Write in order, starting from the smallest.</p> <p style="text-align: center;">45%, $\frac{2}{5}$, $\frac{4}{9}$, 0.44</p> <p style="text-align: right;">Ans _____</p>	
<p>10 A plane is travelling at a speed of 0.25 kilometres per second. What is its speed in kilometres per hour?</p> <p style="text-align: right;">Ans _____</p>	

<p style="text-align: center;">QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK</p>	<p style="text-align: center;">SPACE FOR ROUGH WORK (IF NECESSARY)</p>
<p>11 Alan, Bernard, Charles and David share a flat. They decide to share their electricity costs in a way that Alan pays twice the amount that each of the others pay. What fraction of the electricity bill does Alan pay?</p> <p style="text-align: right;">Ans _____</p>	
<p>12 John has €15 in 20 cent coins. How many coins does he have?</p> <p style="text-align: right;">Ans _____</p>	
<p>13 Which of the following is the biggest?</p> <p>a. 62% of €44.50</p> <p>b. Half of €44.50</p> <p>c. $\frac{2}{3}$ of €44.50</p> <p style="text-align: right;">Ans _____</p>	
<p>14 Calculate:</p> $\frac{(3.6 + 2.4)^2}{6} + 5 \times 2^2$ <p style="text-align: right;">Ans _____</p>	
<p>15 Use $\pi = \frac{22}{7}$ to determine the area of a circle with radius 70 cm.</p> <p style="text-align: right;">Ans _____</p>	
<p>16 A plan of a house is drawn to a scale of 1:100. The width of the living room on this plan is 4.8 cm long. A new plan is to be drawn, this time to a scale of 1:50. What is the width of the living room on the new plan?</p> <p style="text-align: right;">Ans _____</p>	

<p style="text-align: center;">QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK</p>	<p style="text-align: center;">SPACE FOR ROUGH WORK (IF NECESSARY)</p>
<p>17 In the diagram below, the lengths shown are in cm. Which TWO of the following triangles are congruent?</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>A</p> </div> <div style="text-align: center;">  <p>B</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 20px;"> <div style="text-align: center;">  <p>C</p> </div> <div style="text-align: center;">  <p>D</p> </div> </div> <p style="text-align: center; margin-top: 10px;"><i>Diagram not drawn to scale</i></p> <p style="text-align: right; margin-top: 10px;">Ans _____</p>	
<p>18 Patrick is thinking of a number. 10% of the number is 80. What is 15% of the number?</p> <p style="text-align: right; margin-top: 10px;">Ans _____</p>	
<p>19 What is $\frac{3}{8}$ of $\frac{4}{5}$ of 200?</p> <p style="text-align: right; margin-top: 10px;">Ans _____</p>	
<p>20 Work out 17.5% of 80 m.</p> <p style="text-align: right; margin-top: 10px;">Ans _____</p>	



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**SECONDARY EDUCATION CERTIFICATE LEVEL
2021 MAIN SESSION**

SUBJECT:	Mathematics
PAPER NUMBER:	IIA
DATE:	12 th June 2021
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	$\pi r l$
Surface Area of a Sphere	$4\pi r^2$
Volume of a Pyramid / Right Circular Cone	$\frac{1}{3}$ base area \times 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	$a^2 = b^2 + c^2 - 2bc \cos A$

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1	2	3	4	5	6	7	8	9	10	11	Total

1 (a) Solve the inequality: $-4 < 3x - 2 \leq 13$

(b) Solve: $(0.125)^x = 2$

(2)

(c) Simplify: $\frac{x^2 + 3x - 10}{x^2 - 3x + 2}$

(2)

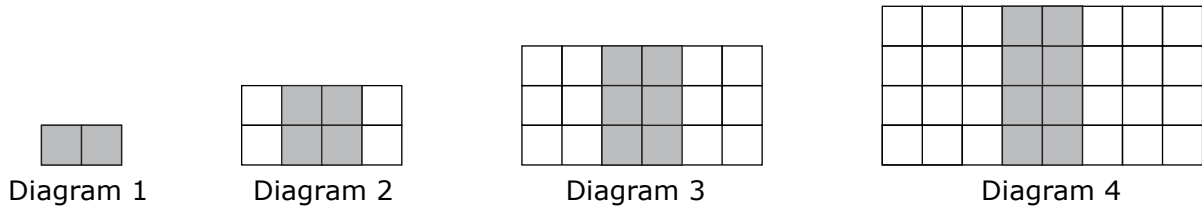
(3)

(d) Express as a single fraction: $\frac{1}{x} + \frac{x}{x(x-2)}$

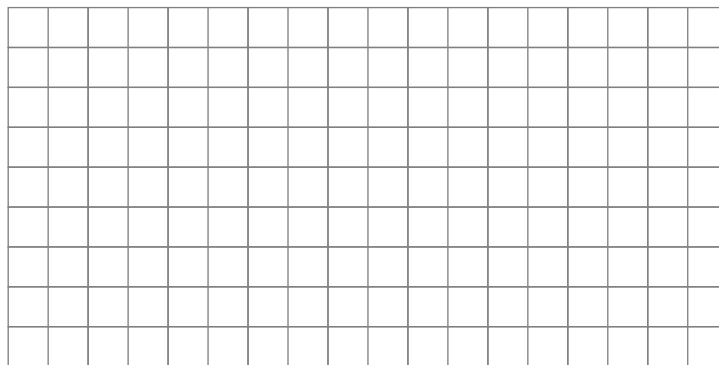
(2)

(Total: 9 marks)

2 The diagrams below follow a pattern.



(a) Using the squared grid below, draw Diagram 5, the next pattern in the sequence.



(2)

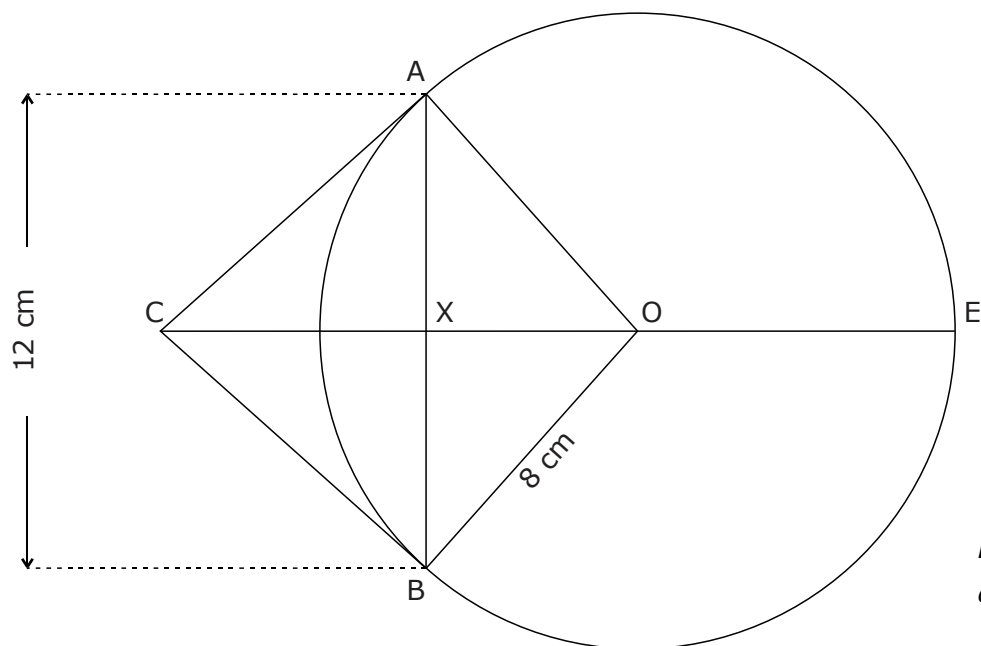
(b) Complete the table below:

Diagram	1	2	3	4	5	N
Number of grey squares	2	4	6	8		
Total number of squares	2	8	18	32		
Number of white squares	0	4	12	24		

(6)

(Total: 8 marks)

- 3 The diagram shows a circle centre O and radius 8 cm. The chord AB is 12 cm long. CA and CB are tangents to the circle at A and B respectively. CO produced meets the circle at E .



*Diagram not
drawn to scale*

Use trigonometry to find:

(a) $\angle AOB$

(b) length of CA ;

(4)

(3)

(c) length of CE.

(3)

(Total: 10 marks)

4 A bookshelf is 120 cm long, to the nearest centimetre.

(a) Write the lower bound and the upper bound of the length of the shelf.

(2)

Petra places five box files next to each other and upright on the shelf.
Each box file is 7.5 cm wide, to the nearest millimetre.

(b) What is the greatest possible length of the remaining space on the shelf?

(4)

(Total: 6 marks)

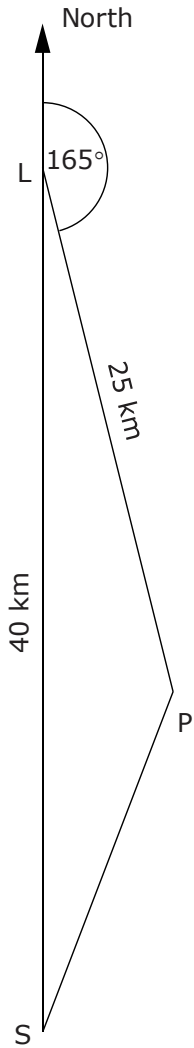
5 Antida would like to invest €5000 for two years.
Melite Savings Account is offering an interest rate of 2.4% for the first year of investment and a higher rate for the second year. Tax of 35% will be deducted at the end of each year on the interest earned. The remaining interest is added to her investment.

(a) How much will Antida's investment be worth at the end of the first year, after tax is deducted?

(b) Antida calculates that, after tax has been deducted, her investment will be worth €5193.50 at the end of the second year. Calculate the rate of interest for the second year. Give your answer as a percentage, correct to one decimal place. (4)

(4)
(Total: 8 marks)

6



An oil rig is anchored at P, 25 km away from a lighthouse L.

P is on a bearing of 165° from L.

A serving boat sails from S to P.

S is 40 km south of L.

(a) Find the bearing of L from P.

(2)

(b) Find the distance SP, in kilometres. Round your answer to four significant figures.

(4)

(c) Calculate the value of $\angle LSP$.

(3)

(d) Find the bearing of S from P.

(2)

(Total: 11 marks)

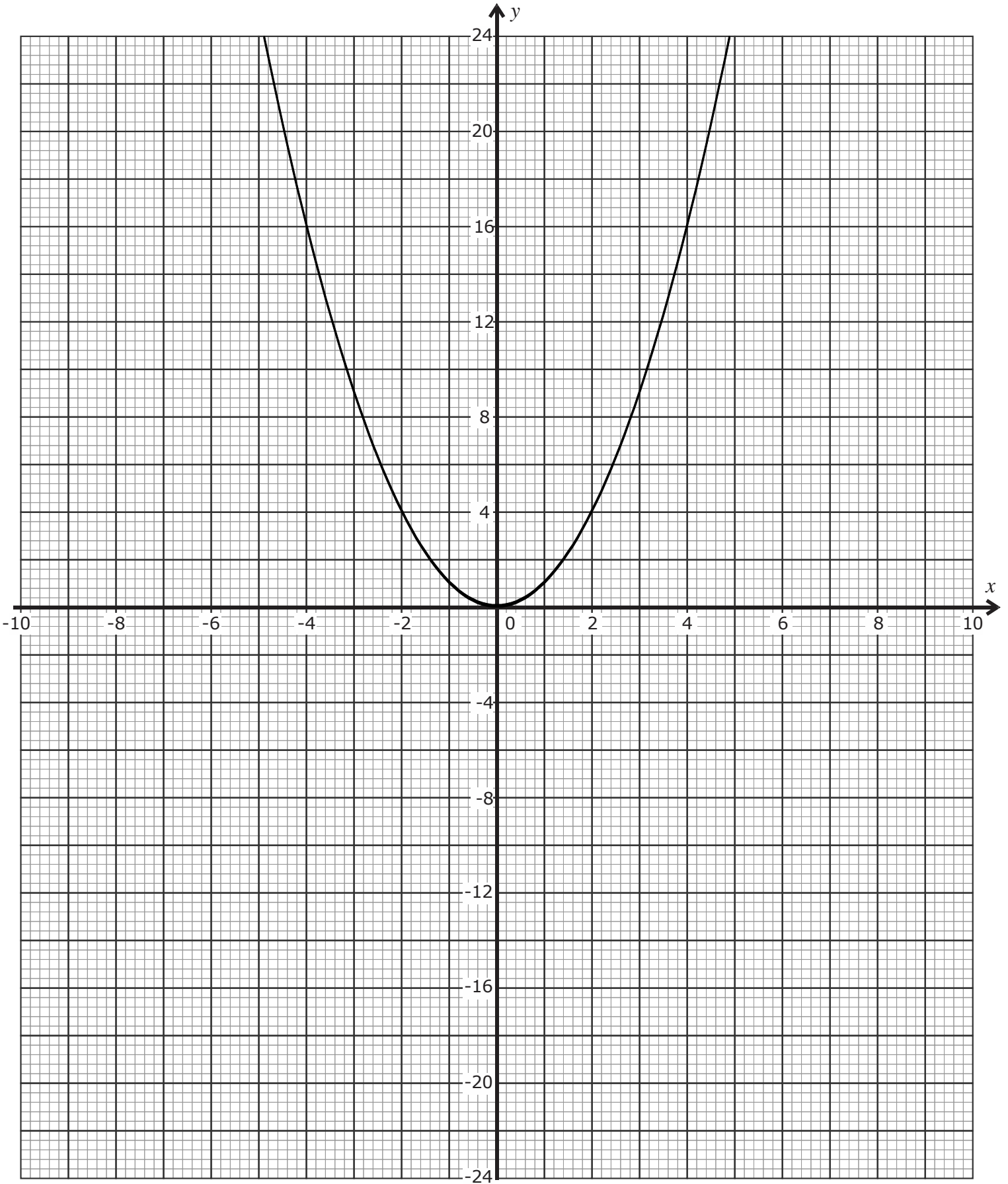
- 7 Many parts of this question require you to use the graph provided on the next page. The graph of the curve $y = x^2$ has already been drawn on the provided axes.

- (a) Complete the following table of values for the equation $y = x + \frac{10}{x}$.

x	-10	-5	-3	-1	-0.5	0.5	1	3	5	10
$y = x + \frac{10}{x}$	-11		-6.33			20.5				

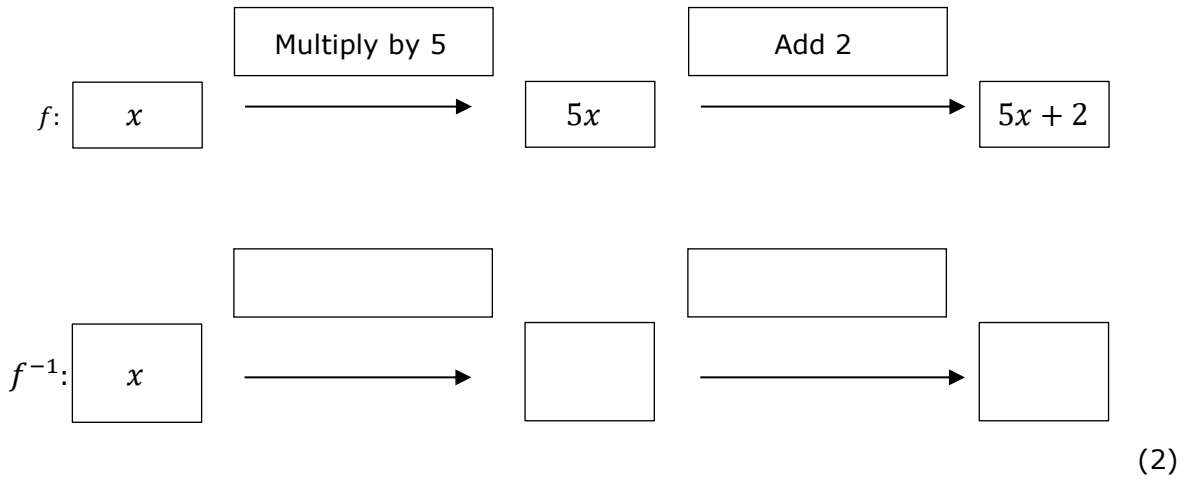
- (b) Use the axes provided to plot the graph $y = x + \frac{10}{x}$ for values of x between -10 and 10. (3)
- (c) Use your graph to solve the equation $x + \frac{10}{x} = 8$. (4)
- (d) Show that the point of intersection of the curves satisfies the equation $x^3 - x^2 - 10 = 0$. (2)
- (e) Use the graph to solve the equation $x^3 - x^2 - 10 = 0$. (1)

(1)



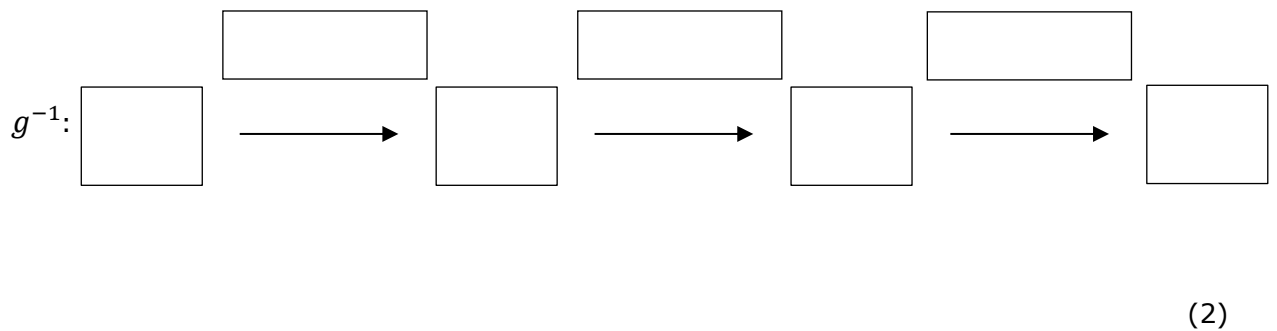
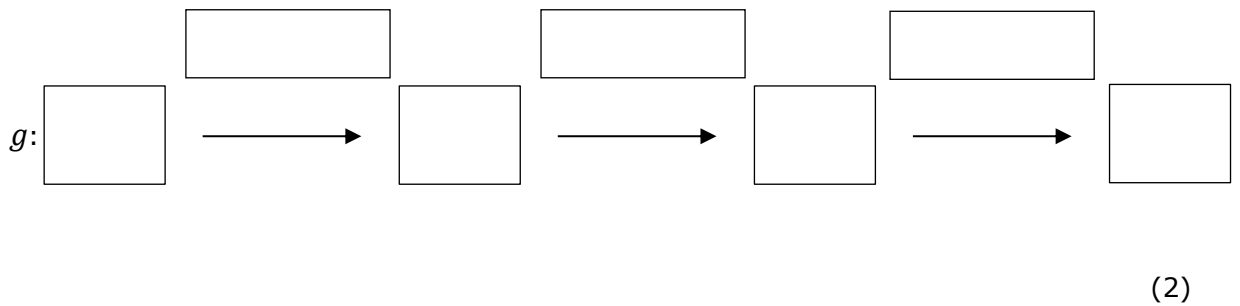
(Total: 11 marks)

- 8 (a) The function machine for $f(x) = 5x + 2$ is shown below.
 Complete the function machine for f^{-1} , the inverse of function f .



- (b) Work out $f^{-1}(7) = \underline{\hspace{2cm}}$
- (1)

- (c) Complete the function machine for $g(x) = 2x^3 - 5$ and for the inverse function g^{-1} .

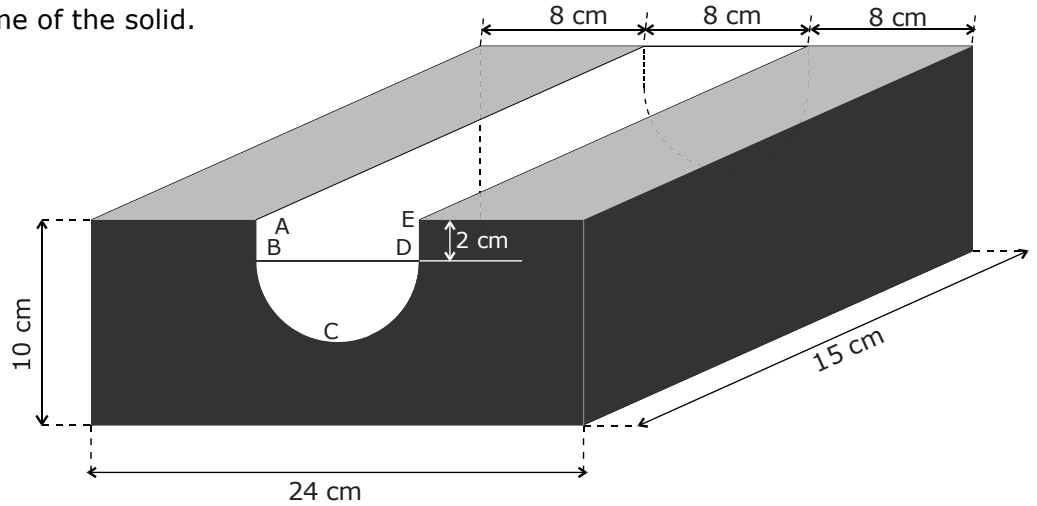


- (d) Fill in $g^{-1}(11) = \underline{\hspace{2cm}}$
- (1)

(Total: 8 marks)

- 9 (a) The diagram shows a metal solid of uniform cross-section of length 15 cm. The curve ABCDE shows the cross-section of the hole at the top of the rectangular block. The curve BCD is a semicircle of diameter 8 cm. The straight lines AB and ED are 2 cm long.

Find the volume of the solid.



- (b) 4000 cm³ of molten metal is to be cast in the shape of two spheres of different sizes. The larger sphere has a radius which is double that of the smaller sphere. What is the radius of the smaller sphere formed if **all** the metal is used? (4)

(5)

(Total: 9 marks)

10 (a) A vet can detect a particular illness in a dog with probability 0.92.

Once the illness is detected, the illness can only be treated through one or two operations.

The first operation cures dogs with probability 0.85.

If the first operation is not successful, the dog gets a second operation. This second operation has 0.65 probability of success.

For a dog visiting the vet with this illness, work out the probability that:

(i) the dog is cured after one operation.

(ii) the dog is cured after the second operation.

(2)

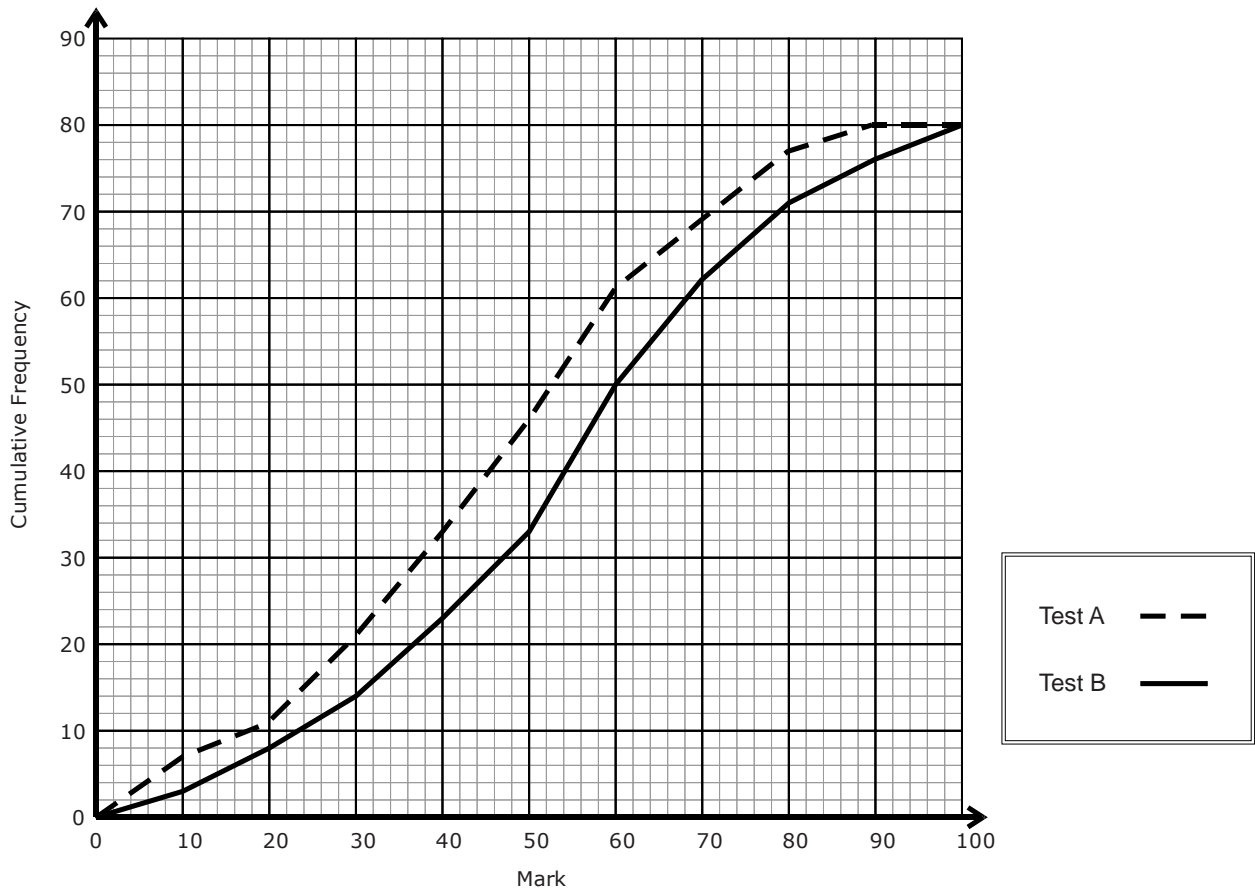
(iii) the dog is cured.

(2)

(2)

- (b) A group of students sat for Test A and Test B.
Both these tests were marked out of 100.

The cumulative frequency for their results on each test are shown in the graphs below.



- (i) How many students took the two tests? (1)
- (ii) What is the median mark for Test A? (1)
- (iii) Which of the two tests was more difficult? Explain your answer. (1)

(2)

(Total: 10 marks)

11 (a) Make x the subject of the formula $a - x = \frac{xb}{c}$

(3)

(b) If $a + b = 40$ and $a^2 + b = 96$,
solve these equations to find the possible values of a and the corresponding values of b .

(5)

(c) The equation $(x - 1)^3 - x = 335$ is true when $x = 8$.
Use this information to find a solution to the equation $(7x - 1)^3 - 7x = 335$.

(2)

(Total: 10 marks)

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**L-Università
ta' Malta**

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE
EXAMINATIONS BOARD

**SECONDARY EDUCATION CERTIFICATE LEVEL
2021 MAIN SESSION**

SUBJECT: **Mathematics**
 PAPER NUMBER: IIB
 DATE: 12th June 2021
 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										

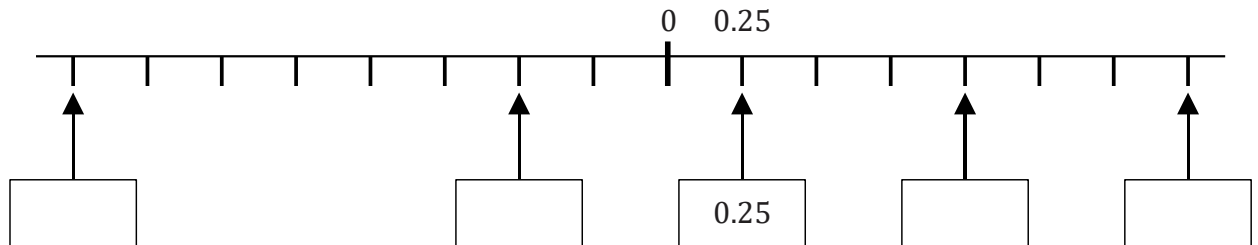
Total Mark

- 1 Mark with a tick (✓) in the adjoining box, the expressions which are equal to $\frac{1}{2}$.

$$\frac{5}{10} \quad \square \quad 1\overline{)2} \quad \square \quad 2\overline{)1} \quad \square \quad 2^{-1} \quad \square \quad 0.2 \quad \square \quad 5^{-1} \quad \square$$

(Total: 3 marks)

- 2 On the number line below, write values which are shown by the arrows.



(Total : 4 marks)

- 3 Write the following fractions in order of size, starting with the smallest:

$$\frac{7}{10}, \quad \frac{2}{3}, \quad \frac{5}{6}, \quad \frac{3}{5}$$

(Total: 3 marks)

4 The following table gives the amount of rice produced by some countries in a particular year.

Country	Rice Produced in tonnes
China	1.47×10^5
India	1.35×10^5
Japan	7.62×10^3
Pakistan	7.20×10^4
Taiwan	1.22×10^3
Thailand	1.86×10^4

(a) Which of the above countries produced:

(i) the largest amount of rice? _____

(ii) the smallest amount of rice? _____

(2)

(b) 1 tonne = 1000 kg.

How many kilograms of rice were produced in Thailand?

Write your answer in standard form.

(2)

(c) Which countries produced more than 100 times the amount of rice produced in Taiwan?

(2)

(Total: 6 marks)

- 5 Calculate the number of sides of a regular polygon whose interior angles are each 140° .

(Total: 3 marks)

- 6 Sandra visited Poland for a holiday.

- (a) She exchanged €450 to Polish zloty (PLN) at a rate of 4.48 PLN per euro.
How many zlotys should she receive at this rate of exchange?

- (b) On her return Sandra had 545 PLN left over, which she wanted to exchange back to euro. She received €118. How many zlotys did the bank exchange for each euro on the day?
Give your answer correct to four decimal places.

(2)

(Total: 4 marks)

- 7 A sandpit is in the shape of a circular cylinder with radius 1.50 m and depth 35 cm.

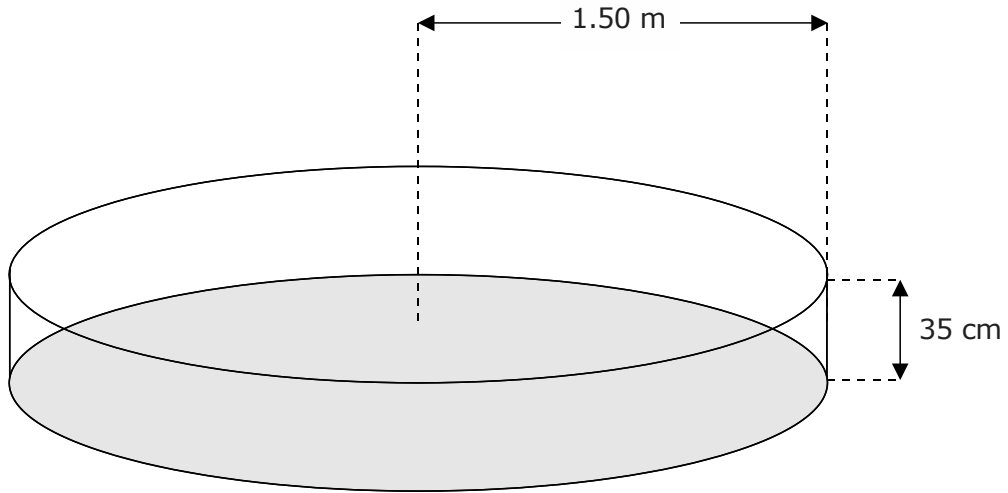


Diagram not drawn to scale

- (a) Find the circumference of the sandpit in metres. Give your answer correct to one decimal place.
- (b) The pit is to be filled completely with sand. Calculate the volume of sand, in m^3 , that is needed. Give your answer to two decimal places.

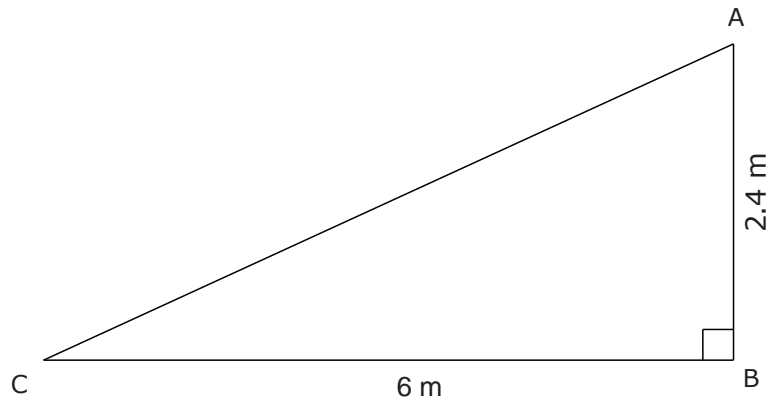
(3)

(3)

(Total: 6 marks)

- 8 The figure shows a triangle ABC which is right angled at B; where $AB = 2.4$ m and $BC = 6$ m. Determine the length of AC.

Diagram not drawn to scale



(Total: 3 marks)

- 9 (a) Given that $x = -3$, $y = 7$ and $z = 10$, find the value of the expression $\frac{5(x^2 - y)}{z}$

(2)

- (b) Simplify: $\frac{p^5 \times p^3}{p^2}$

(2)

(Total : 4 marks)

10 A blue dice is numbered 1 to 6. A red dice has its faces numbered 1, 1, 2, 3, 3 and 4.

These 2 dice are thrown together and the outcome of the two dice is added.

(a) Complete the possibility space for the sum of the outcomes in the table below.

		Blue Dice					
		1	2	3	4	5	6
Red Dice	1	2					
	1	2					
	2	3					
	3	4					
	3	4					
	4	5					

(b) Find the probability that the total is an even number. (2)

(c) Find the probability that the total is 6. (2)

(2)

(Total: 6 marks)

- 11 (a) Draw a diagram which shows how many squares of side 0.5 m are needed to cover a square of side 1 m.

(b)

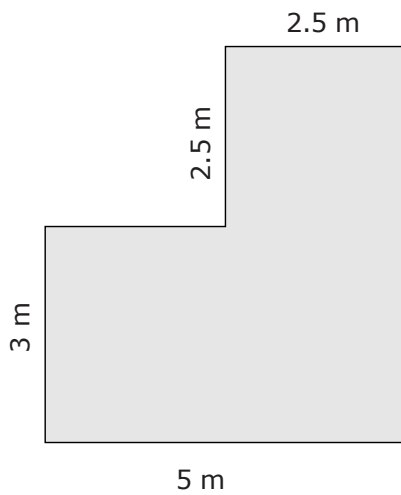


Diagram not drawn to scale

(2)

The shaded area shows a floor space that needs to be tiled.
Work out its area.

- (c) How many square tiles of side 0.5 m are needed to cover this floor space?

(3)

(1)

(Total: 6 marks)

- 12 The diagram shows a circle centre O.
The points A, B, C and D lie on the circumference of this circle.

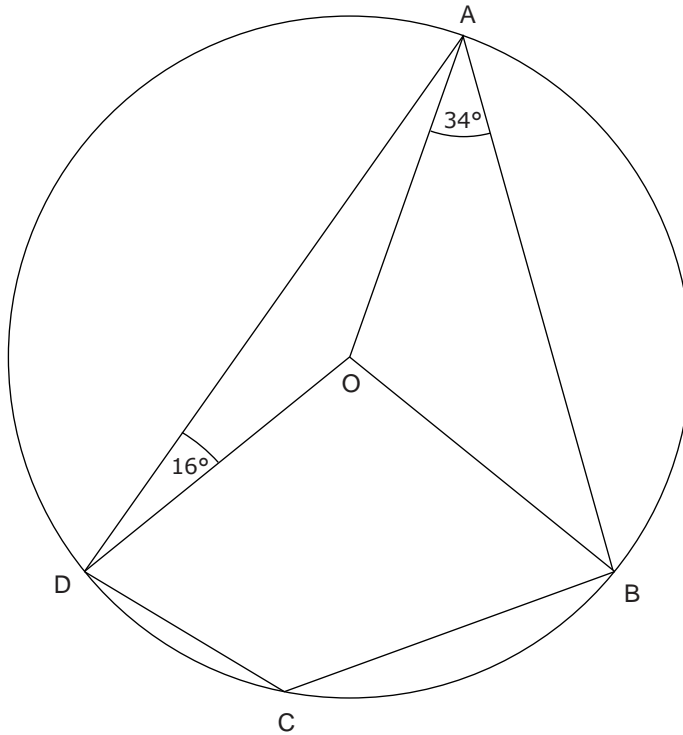


Diagram not drawn to scale

Using the information given in the figure, work out the following angles, giving reasons for your answers.

(a) $\angle DAO$

(b) $\angle DOB$

(2)

(c) $\angle DCB$

(2)

(2)

(Total : 6 marks)

- 13 The scale diagram below shows a rectangular garden ABCD in which 1 cm represents 2 m.



- (a) Find the actual length AB and width BC of the garden, giving your answer in metres.

AB = _____

BC = _____

(3)

- (b) A water tap is located at the corner A. The tap is connected with a pipe 18 m long. Use the diagram to shade the region within the garden which is within reach of the water pipe.

(3)

(Total: 6 marks)

- 14 A road joining village A to village B has three roundabouts R_1 , R_2 and R_3 . The roundabouts divide the road in the ratio 4 : 3 : 5 : 3. The distance between village A and the second roundabout is 33.6 km.



- (a) Calculate the distance between the first and the second roundabout.

(2)

(b) Work out the length of the road joining village A to village B.

(2)

(Total: 4 marks)

15 In a survey, a group of students were asked how many books they read during summer. The results are shown below:

Number of books	0	1	2	3	4	5	6	7
Frequency	10	12	11	9	8	5	4	1

(a) How many students took part in the survey?

(1)

(b) Find the mean number of books read by the students.

(3)

(c) Find the median number of books read by the students.

(2)

(Total: 6 marks)

16 At 12:00, a coastguard observes a ship at A, 10 km away and due south of his coastguard station S.

The ship sails at a steady speed on a fixed bearing.

At 12:45 the ship is at B, 15 km due west of the coastguard station, S.

(a) Draw a diagram to show the positions of A, B and S.

(b) Find $\angle BAS$.

(2)

(c) Find the bearing of B from A.

(3)

(2)

(Total: 7 marks)

17 Rearrange the formula to make x the subject:

$$3x - a = b(2 + x)$$

(Total: 4 marks)

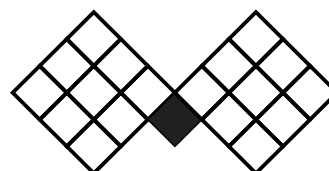
18 The following patterns are made by using small square tiles.



Pattern 1



Pattern 2



Pattern 3

(a) How many tiles are needed to form Pattern 4?

(2)

(b) Write an expression for the number of tiles in Pattern n .

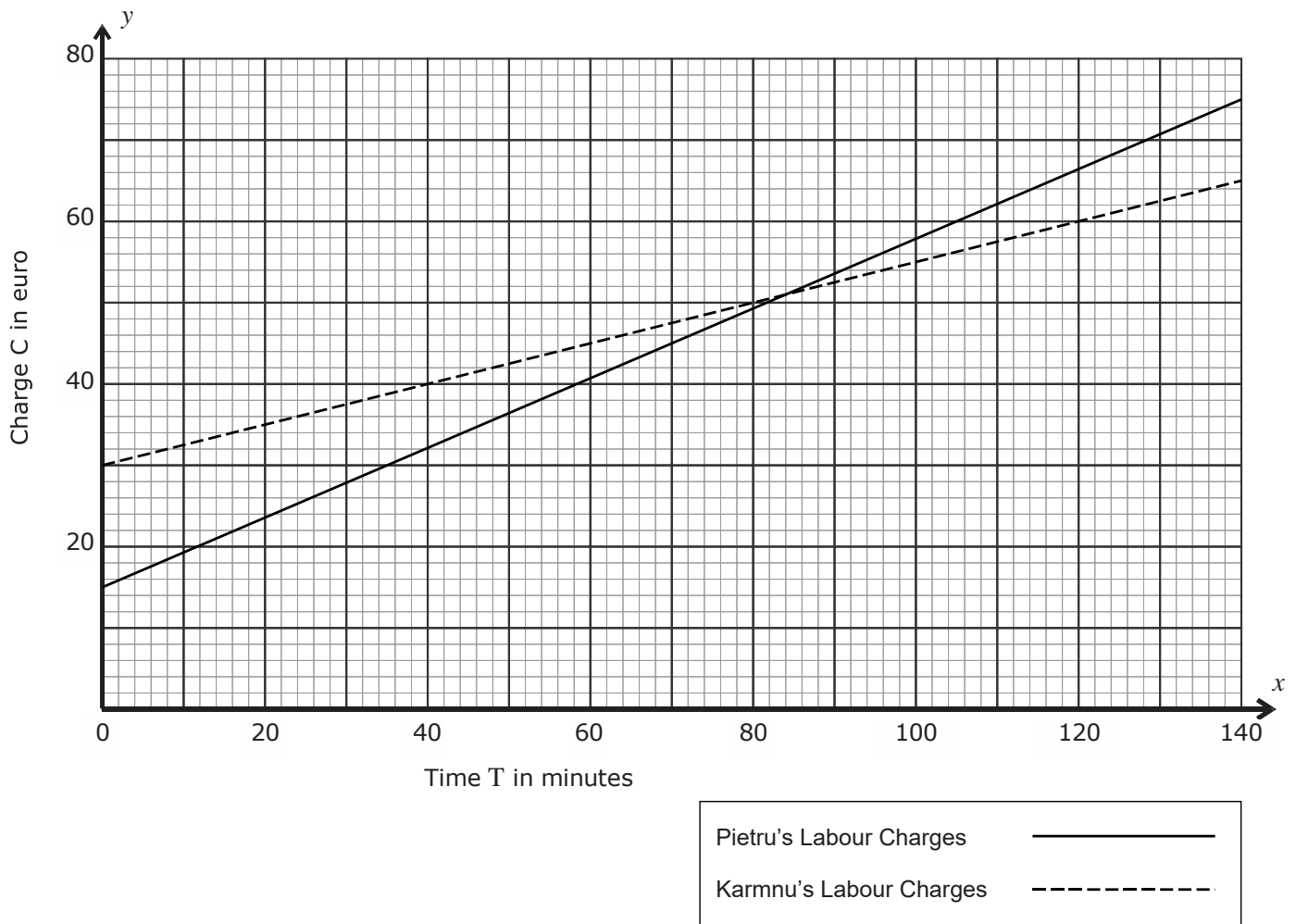
(2)

(c) Is it possible to make a pattern using exactly 883 tiles? Explain your reasoning.

(3)

(Total: 7 marks)

- 19 Pietru and Karmnu are technicians. They both offer home repair services on household items. The labour costs they charge for each house visit depends on the time they take to make the necessary repairs.
- The graphs show the labour charge for each technician.



- (a) Which technician offers the cheaper option for a repair which takes 1 hour?

(1)

- (b) Calculate the gradient of Karmnu's graph in euro per hour.

(2)

(c) Fill in the blanks:

Karmnu charges an initial fee of _____ euro and a fee of _____ euro per hour.

Pietru charges an initial fee of _____ euro and a fee of _____ euro per hour.

(4)

(Total: 7 marks)

20 From a point 130 m horizontally from the base of a building, the angle of elevation of the top of the building is 32° .

(a) Draw a sketch to represent the above information.

(2)

(b) Use trigonometry to calculate the height of the building.

(3)

(Total: 5 marks)

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