



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2026

Mathematics

Paper 1

Ordinary Level

Friday 5 June Afternoon 2:00 - 4:30

300 marks

Examination Number

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Date of Birth

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For example, 3rd February
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Centre Stamp

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Instructions

There are **two** sections in this examination paper.

Section A	Concepts and Skills	150 marks	6 questions
Section B	Contexts and Applications	150 marks	4 questions

Answer questions as follows:

- any **five** questions from Section A – Concepts and Skills
- any **three** questions from Section B – Contexts and Applications.

Write your Examination Number in the box on the front cover.

Write your answers in blue or black pen. You may use pencil in graphs and diagrams only.

This examination booklet will be scanned and your work will be presented to an examiner on screen. Anything that you write outside of the answer areas may not be seen by the examiner.

Write all answers into this booklet. There is space for extra work at the back of the booklet. If you need to use it, label any extra work clearly with the question number and part.

The superintendent will give you a copy of the *Formulae and Tables* booklet. You must return it at the end of the examination. You are not allowed to bring your own copy into the examination.

In general, diagrams are not to scale.

You will lose marks if your solutions do not include relevant supporting work.

You may lose marks if the appropriate units of measurement are not included, where relevant.

You may lose marks if your answers are not given in simplest form, where relevant.

Write the make and model of your calculator(s) here:

Answer **any five questions** from this section.

Question 1**(30 marks)**

- (a) Sara pays for lunch for herself and a friend.
Sara's lunch costs €34.60 and her friend's lunch costs €28.90.
A service charge of 12% is then added on.

Find the **total** cost of lunch, after the service charge has been added on.

- (b) David buys a car for €22 600.
It depreciates (goes down in value) by 18% each year, compounded annually.

(i) How much does the car depreciate by in the 1st year?

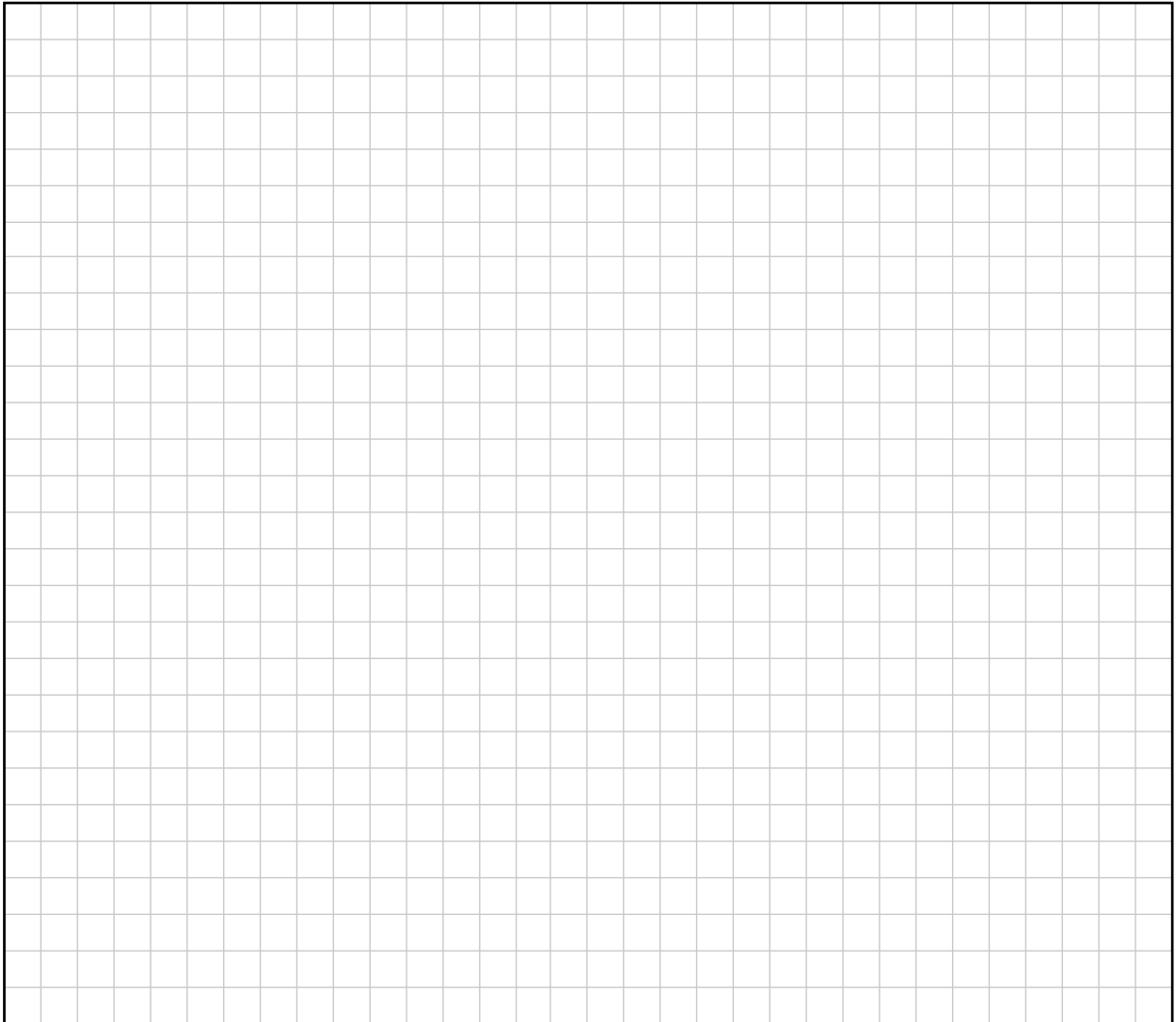
(ii) Find the value of the car after 2 years.

(c) A machine was bought for €28 000.

The value of the machine depreciated by $k\%$ each year for 2 years, where $k \in \mathbb{R}$.
After 2 years, the machine was valued at €20 230.

Using the following formula, or otherwise, work out the value of k , where F is the value of the machine after t years and P is the initial value of the machine.

$$F = P \left(1 - \frac{k}{100} \right)^t$$

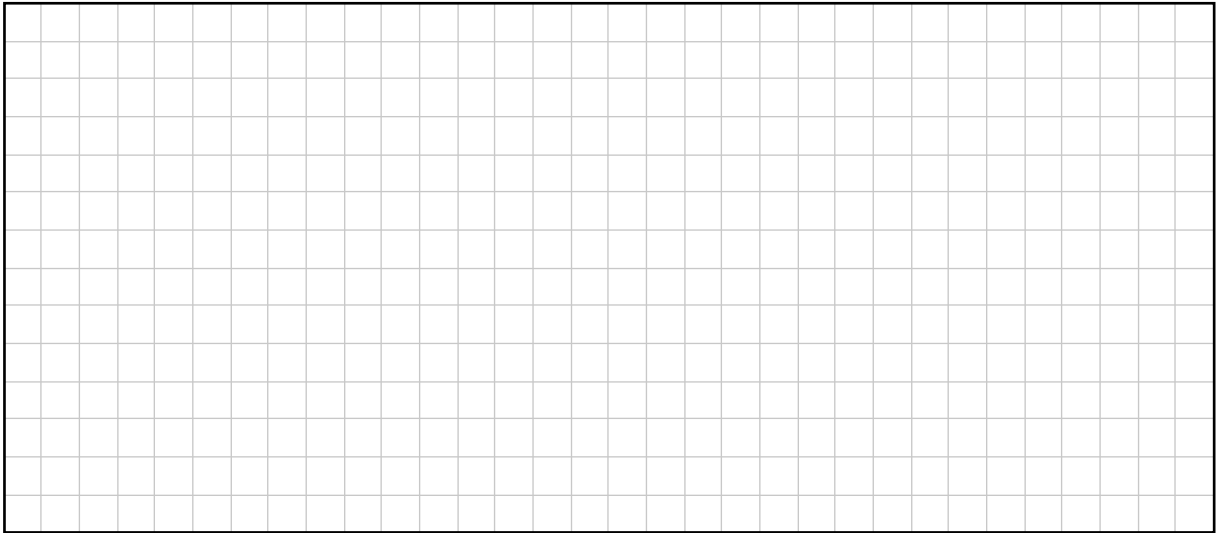


Question 2

(30 marks)

(a) Expand and simplify:

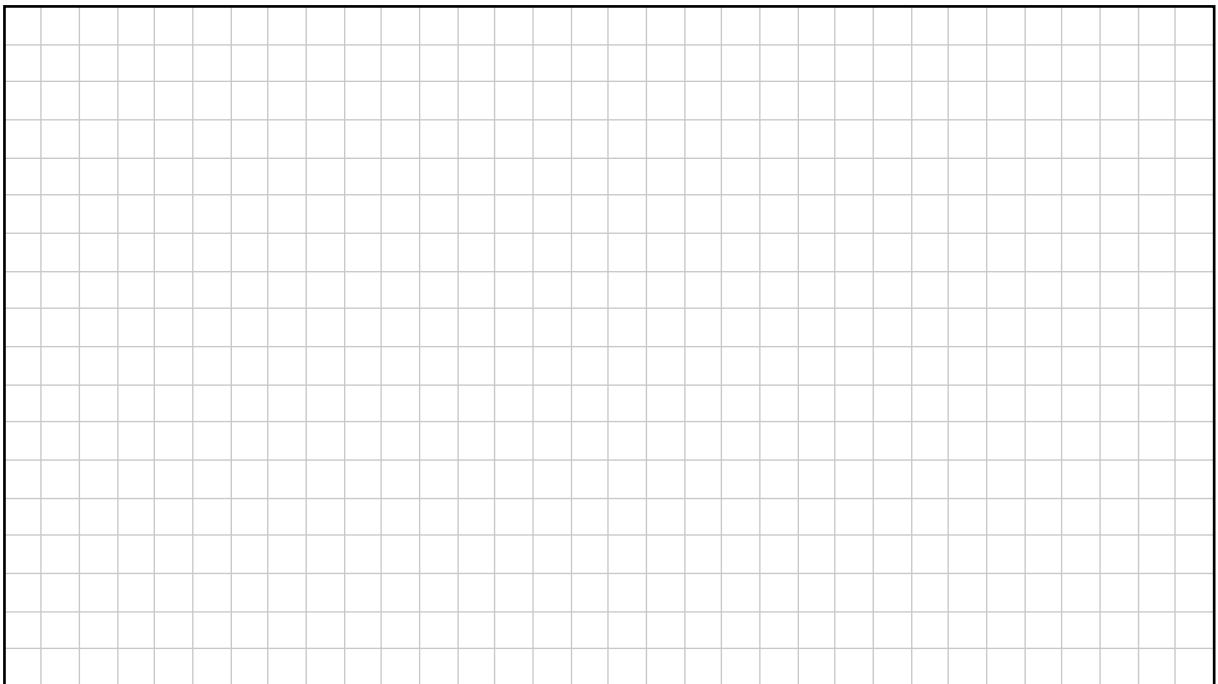
$$(3x - 5)^2 + 4x + 6$$



(b) Solve the following equation in $x \in \mathbb{R}$:

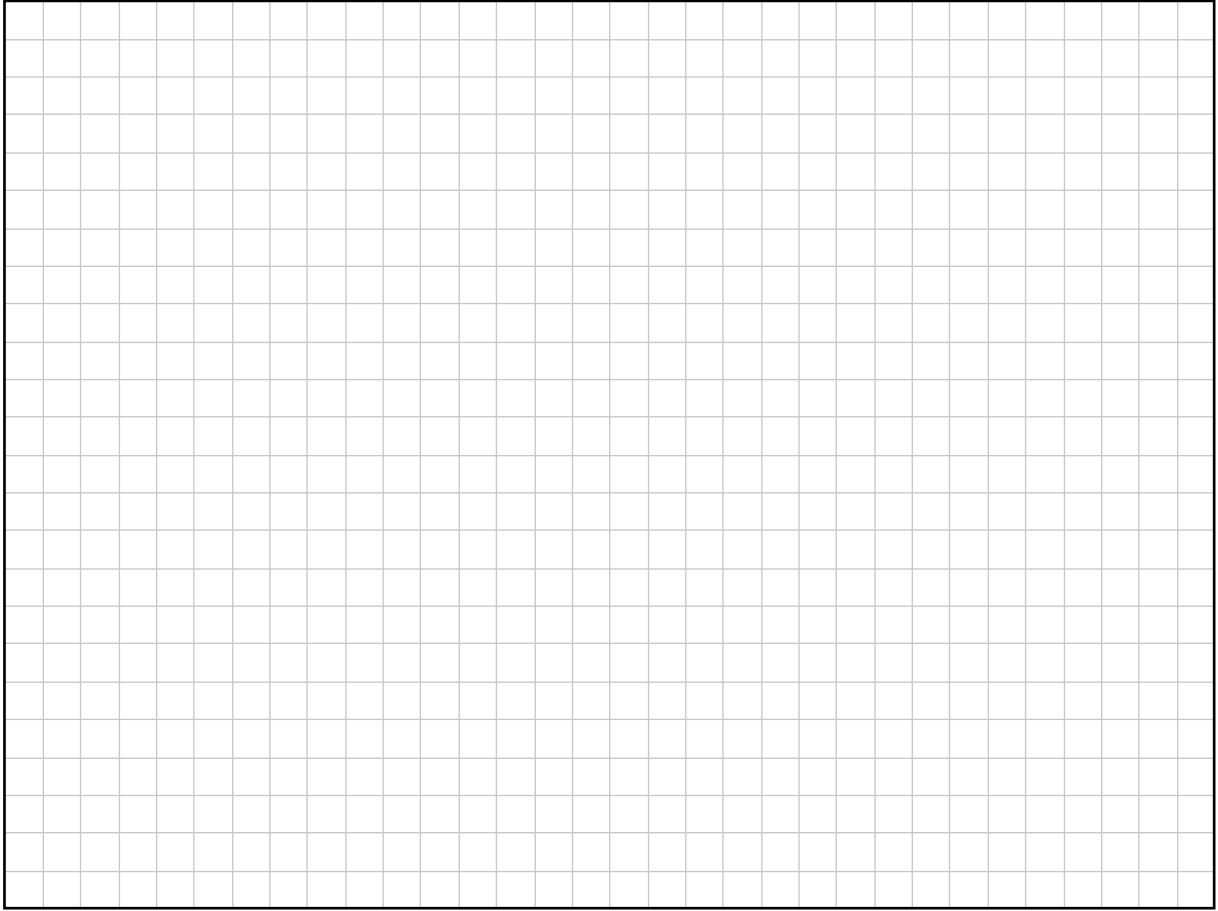
$$3x^2 - 4x - 5 = 0$$

Give each answer correct to 2 decimal places.



(c) Solve the following equation in $x \in \mathbb{R}$, where $x \neq 3, -3$:

$$\frac{5}{x+3} - \frac{5}{x-3} = 6$$



Question 3

(30 marks)

- (a)** Kim is making bread.
She prepares 2200 grams of bread mix.
For every 500 grams of mix, she needs to bake it for 25 minutes.

Work out how many minutes it takes to bake the bread.

A large rectangular grid for working out the solution to part (a). The grid is 20 squares wide and 25 squares high.

- (b)** Write 140 as a product of its prime factors.

A large rectangular grid for writing the prime factors of 140. The grid is 20 squares wide and 25 squares high.

- (c) $x^2 + px + r$ is a quadratic function in which p, r are constants.
This function has roots at $x = 3$ and $x = -7$.

(i) Write down two factors of this function.

Factor one =	
Factor two =	

(ii) Hence, or otherwise, find the value of p and the value of r , where $p, r \in \mathbb{Z}$.

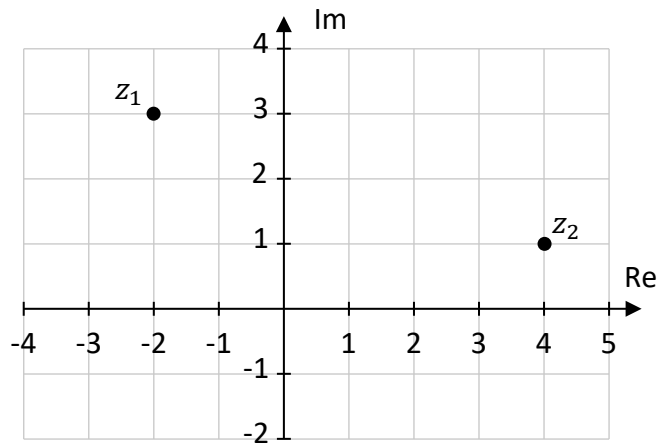
$p =$ _____	$r =$ _____
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Question 4

(30 marks)

In this question, $i^2 = -1$.

(a) The complex numbers z_1 and z_2 are shown on the Argand diagram below.



Using the Argand diagram, write down the values of z_1 and z_2 in the form $a + bi$, where $a, b \in \mathbb{Z}$.

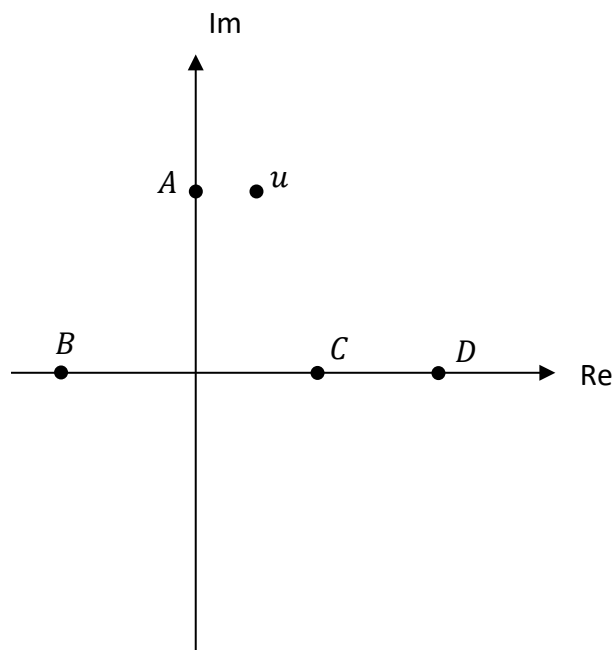
$z_1 =$ $z_2 =$

(b) Find the value of the following expression:

$$i(2 - i) + i^2(2 - i)$$

Give your answer in the form $a + bi$, where $a, b \in \mathbb{Z}$.

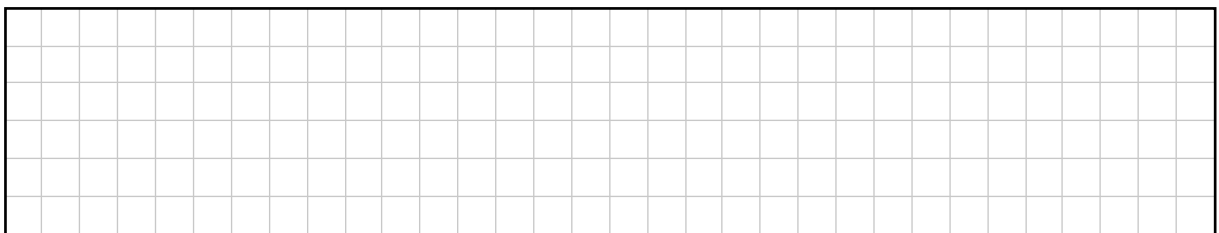
- (c) The complex number u is shown on the Argand diagram below. Four other complex numbers, labelled, A , B , C , and D , are also shown on the Argand diagram. The diagram is drawn to scale. Use the diagram to answer parts (c)(i) to (c)(iii).



- (i) Write down one possible complex number that u could be. Give your answer in the form $a + bi$, where $a, b \in \mathbb{Z}$.

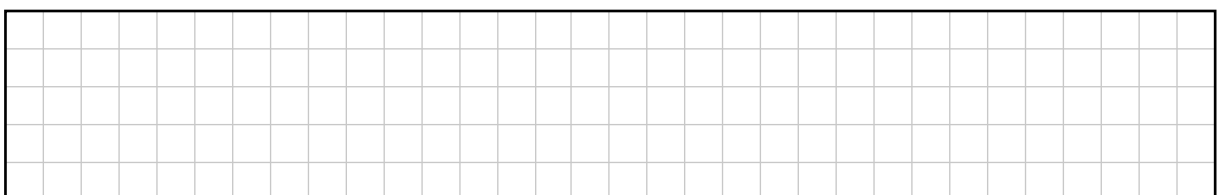
$u =$

- (ii) Plot and label \bar{u} as accurately as you can on the Argand diagram above, where \bar{u} is the complex conjugate of u .



- (iii) Which of the complex numbers A , B , C , or D is equal to $u + \bar{u}$?

Answer: A B C D
 (Tick (✓) **one** box only)



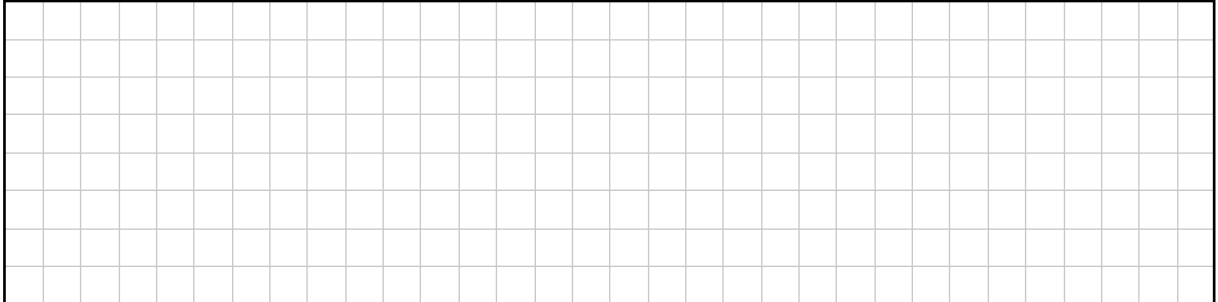
Question 5

(30 marks)

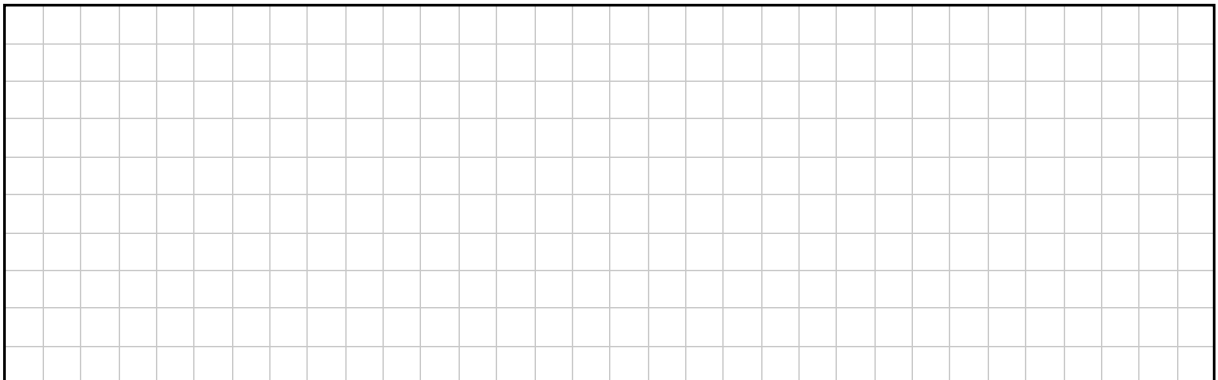
(a) The first three terms of an arithmetic sequence are:

$$12, 17, 22, \dots$$

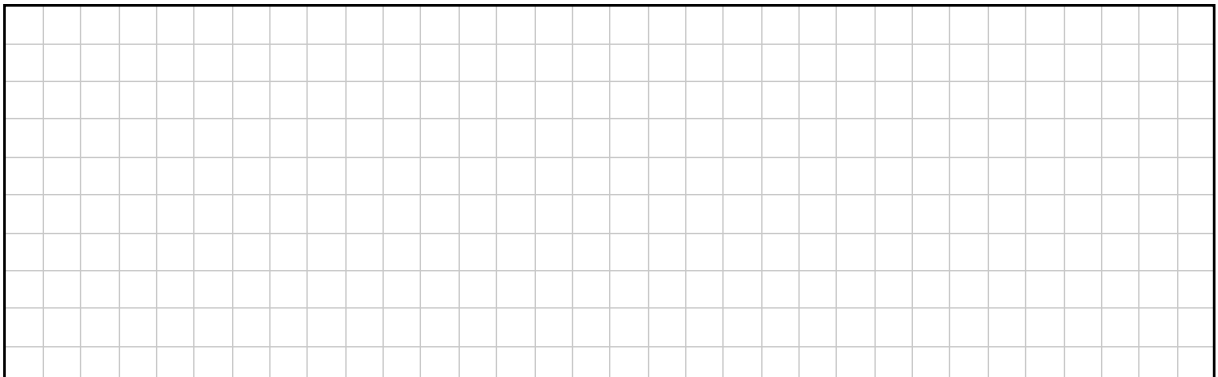
(i) Write down the next three terms of the sequence.



(ii) Find an expression for T_n , the n th term of the sequence.



(iii) Hence, or otherwise, find the value of T_{20} , the 20th term in the sequence.



(b) The first three terms of a different arithmetic sequence are:

$$6, \quad x, \quad -4, \dots$$

Find the value of x .

$x =$ _____

(c) The first three terms of another arithmetic sequence are:

$$43, \quad 39, \quad 35, \dots$$

The first n terms of this sequence are added so that their **sum** is less than zero.
Find the smallest such value of n .

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Question 6

(30 marks)

(a) The function g is defined as $g(x) = 2x - 3$, for $x \in \mathbb{R}$.

(i) Find $g(4)$.

(ii) Find the value of x for which $g(x) = 11$.

(b) The function h is defined as $h(x) = 3x^2 - 2x + 1$.

Find $h'(x)$, the derivative of $h(x)$, **and** hence find the co-ordinates of the local minimum point of h .

$h'(x) =$

Local Minimum point = (,)

- (iii) In the table, T represents the time that bus E arrives at Gowran.
It takes bus E 3 minutes less to travel from Royal Oak to Gowran than it does to travel from Gowran to Thomastown.

Find the time represented by T .

$T =$ _____

- (b) The cost of an adult ticket from Dublin Airport to Waterford Bus Station is € x and the cost of a child ticket is € y .

3 adult tickets and 4 child tickets cost €144.

2 adult tickets and 1 child ticket cost €71.

Find the value of x and the value of y .

Cost of adult ticket, $x =$ _____	Cost of child ticket, $y =$ _____
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This question continues on the next page.

- (c) Luan, Shea, and Tara are all PAYE workers.
 Their tax rates and bands are shown in the table below.
 Assume that no other deductions are made from their income.

Annual Income	Tax Rate
First €44 000	20%
Balance	40%

- (i) Luan has a gross annual income of €37 600. He only pays tax at the lower rate.
 He has an annual tax credit of €4000.

Work out his **net annual tax** and hence work out his **net annual pay**.

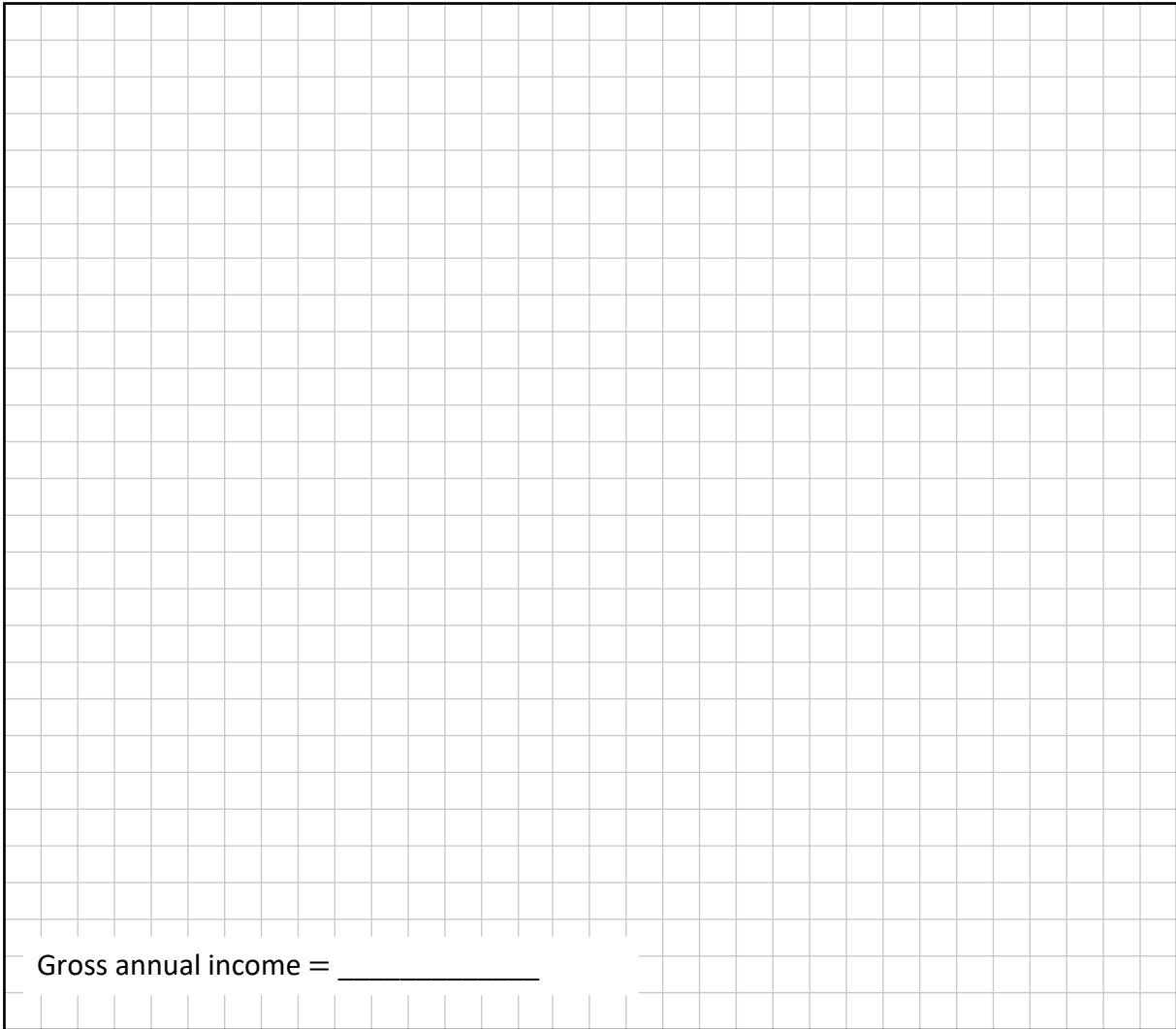
Net annual tax = _____	Net annual pay = _____
------------------------	------------------------

- (ii) Shea has a gross annual income of €63 400. He has an annual tax credit of €4000.

Work out his **net annual tax**.

Net annual tax = _____

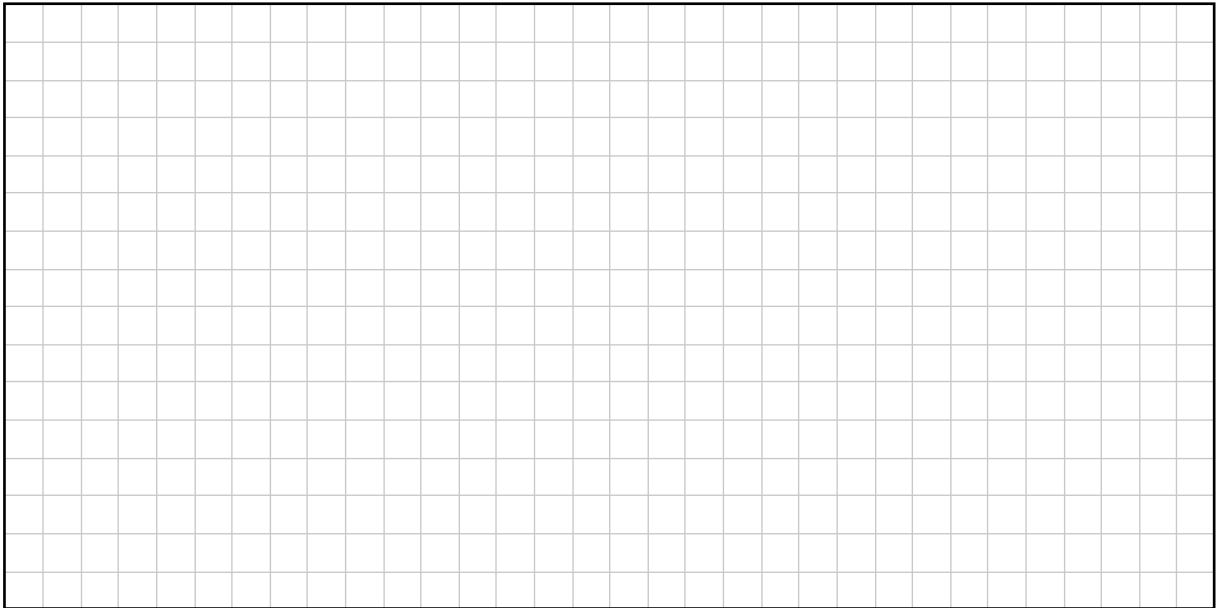
- (iii) Tara has a **net annual tax** of €17 000.
She pays income tax at both tax rates.
She has an annual tax credit of €4000.
Work out her **gross annual income**.



Gross annual income = _____

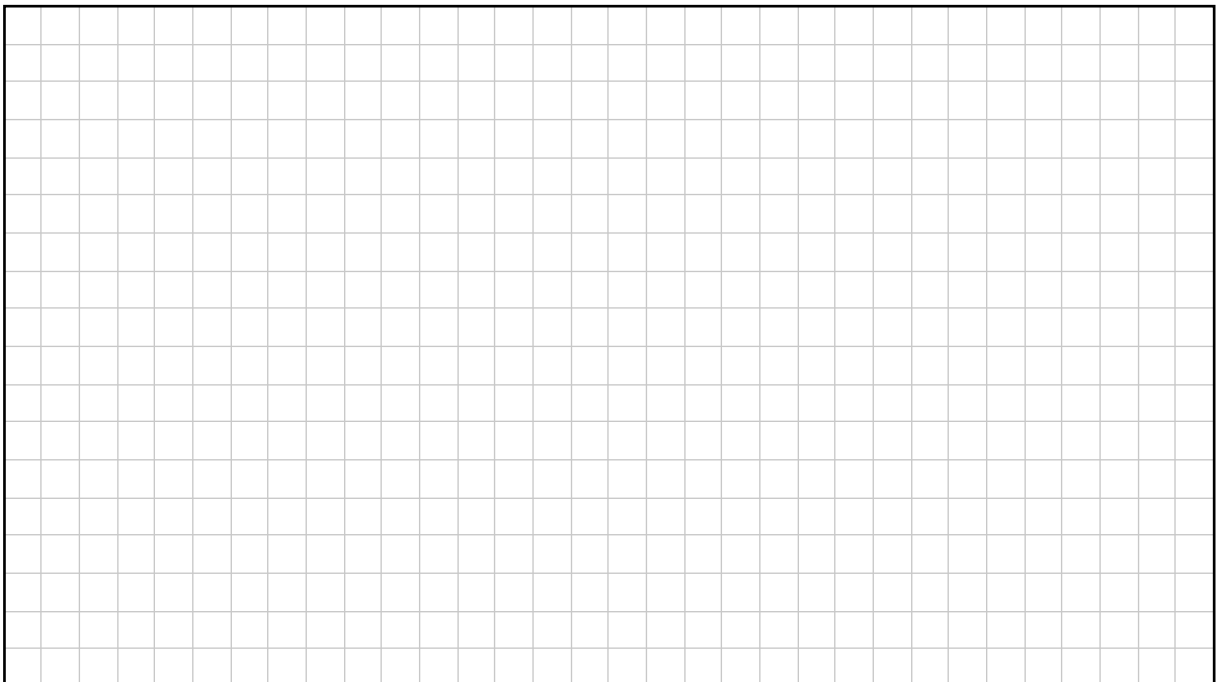
- (iv) Use **calculus** to find the value of x that gives the maximum monthly sales according to the model.

Remember: $S(x) = -x^3 + 9.6x^2 + 25$.



- (v) The sales team spent €5000 on advertising in one particular month and the actual sales were €125 000 in the same month.

Using the relevant value from the table on the previous page, find the **percentage error** in the predicted sales model, $S(x)$, for that month.



This question continues on the next page.

(b) The weekly pay for a holiday representative, € P , is given by the formula:

$$P = rh + 2rt$$

where:

- r = hourly rate of pay
- h = the number of hours worked at the hourly rate of pay, and
- t = the number of overtime hours worked.

(i) Philip has an hourly rate of pay of €15 per hour.
On a particular week, Philip worked 39 hours at the hourly rate of pay.
He also worked 5 hours overtime.

Find Philip's pay for this week.

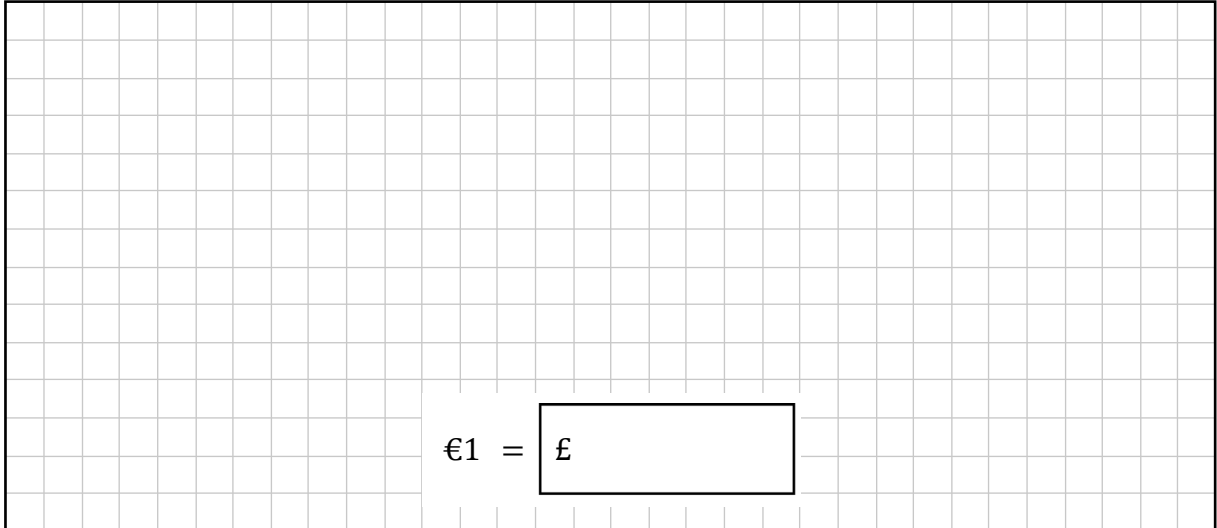
(ii) Rearrange the formula $P = rh + 2rt$ to write r in terms of P , h , and t .

(iii) Philip's hourly rate of pay is increased. The next week he is paid a total of €892.50 for working 35 hours at the hourly rate of pay and 8 hours overtime.

Using your answer from (b)(ii), or otherwise, work out Philip's new hourly rate of pay.

- (b) Dean, Saoirse, Kayla, and Olor enter the London marathon.
The entry fee is £80 sterling per person plus a carbon offset levy of £145 sterling per person.
The total cost, in euro, for the 4 people is €1020.

Work out the exchange rate used, that is, work out how much sterling is equal to €1.
Give your answer correct to 3 decimal places.

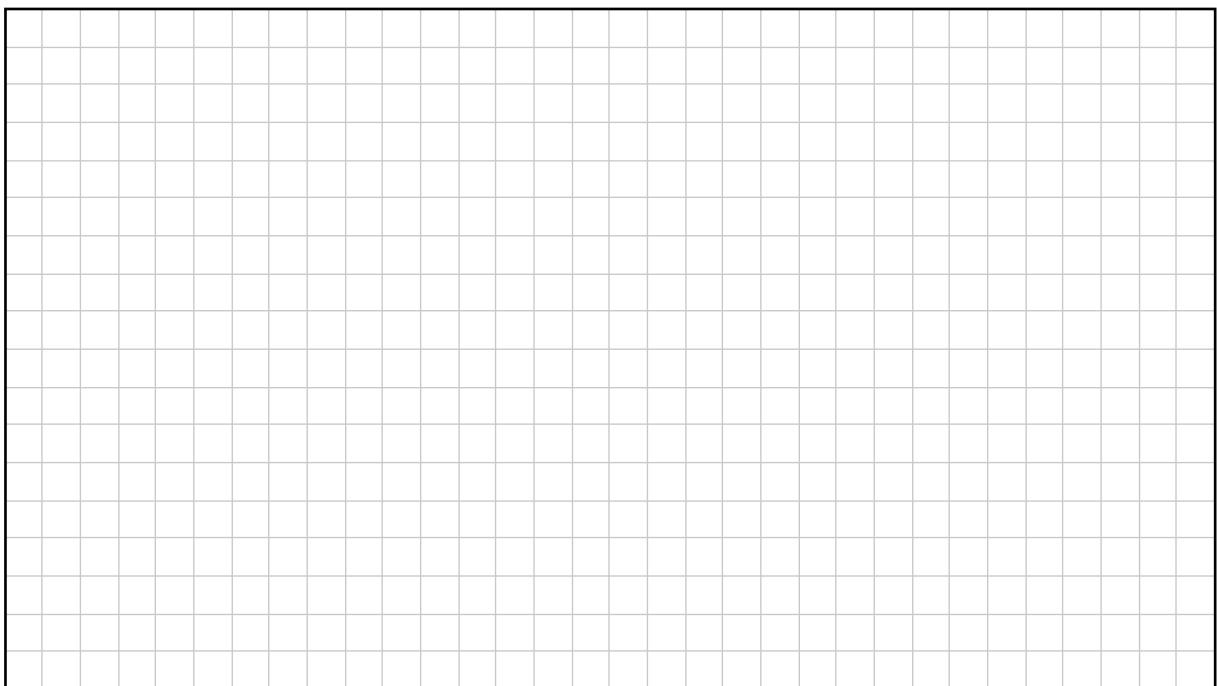


€1 = £

- (c) Saoirse completes a 5 km run in 25 minutes.

Work out her **average speed** for the 5 km run.

Give your answer in **metres per second** correct to 1 decimal place.



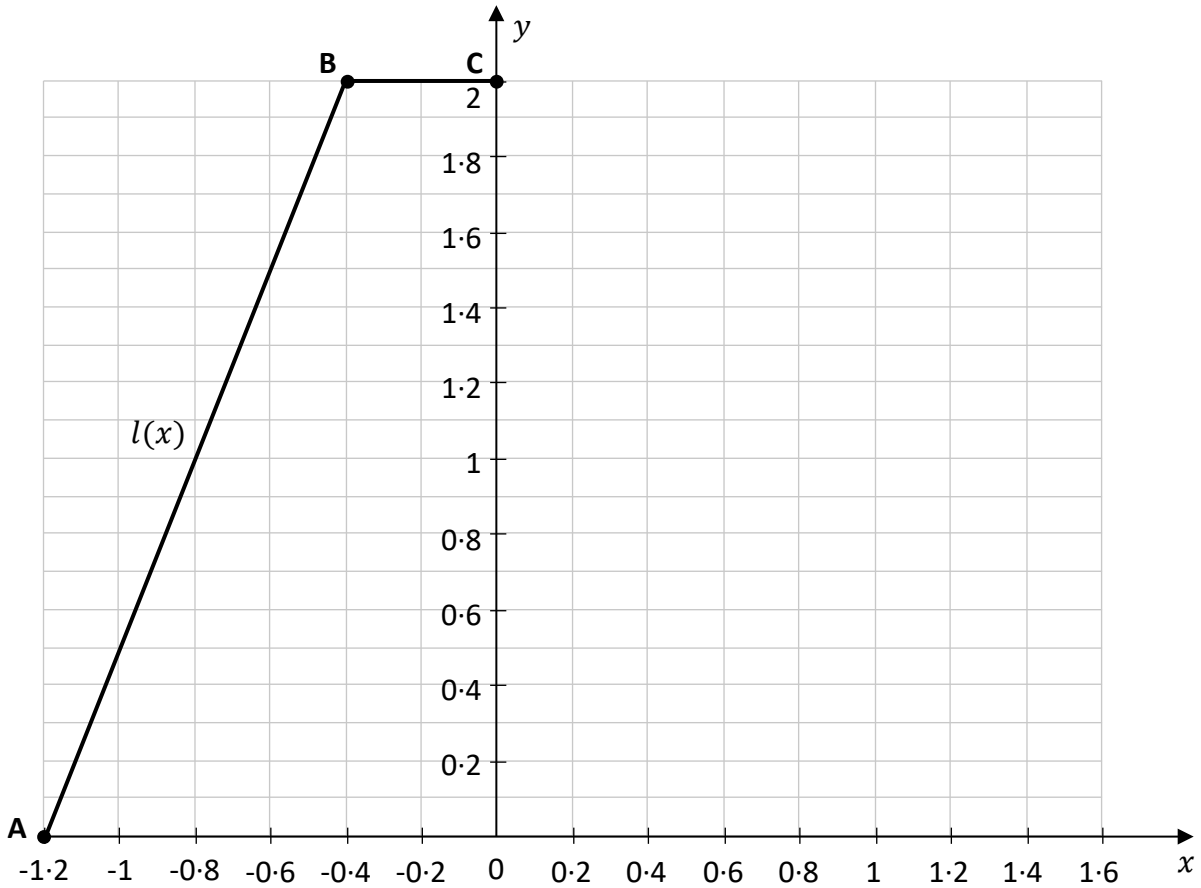
Question 10

(50 marks)

(a) The co-ordinate diagram below shows the cross section of the ladder and top of a child's slide. **A**, **B**, and **C** are points on the slide. The slide is on horizontal ground (x -axis). Each unit in the diagram is 1 m.

- The ladder, labelled $l(x)$, goes from the point **A** to the point **B**.
- The top of the slide goes from the point **B** to the point **C**.

You will draw the downward part of the slide later.



(i) Write down the height of the slide in metres.

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(ii) Write down the length of the top of the slide, that is, the distance from **B** to **C**. Give your answer in centimetres.

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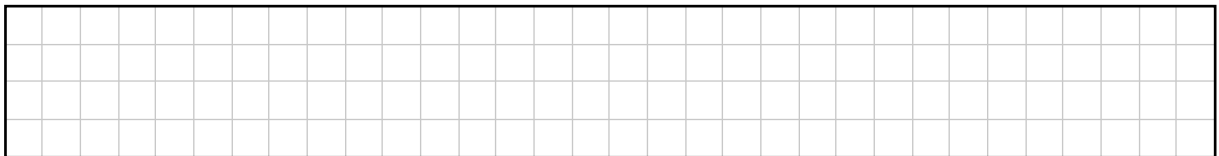
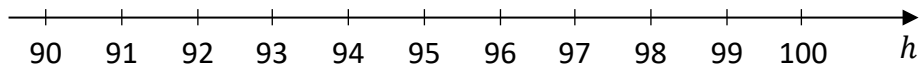
Another slide in a children's play area has two restrictions on its use.

(b) All children using the slide must be **at least** 95 cm tall.

(i) By writing in the missing symbol ($<$, $>$, \leq , or \geq), complete the inequality below to show this information, where h cm is the height of a child.

$$h \quad \boxed{} \quad 95$$

(ii) Graph the inequality from part **(b)(i)** on the following number line for $h \in \mathbb{R}$, showing the allowable heights.

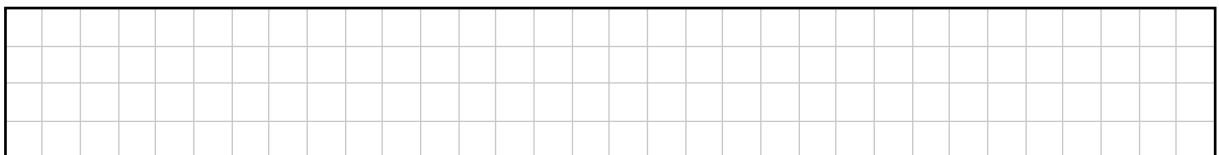
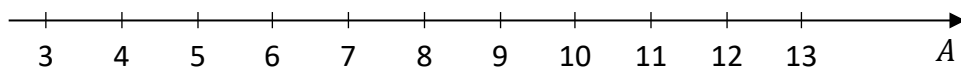


(c) All children using the slide must also be **at least** 4 years old but **younger than** 12 years old.

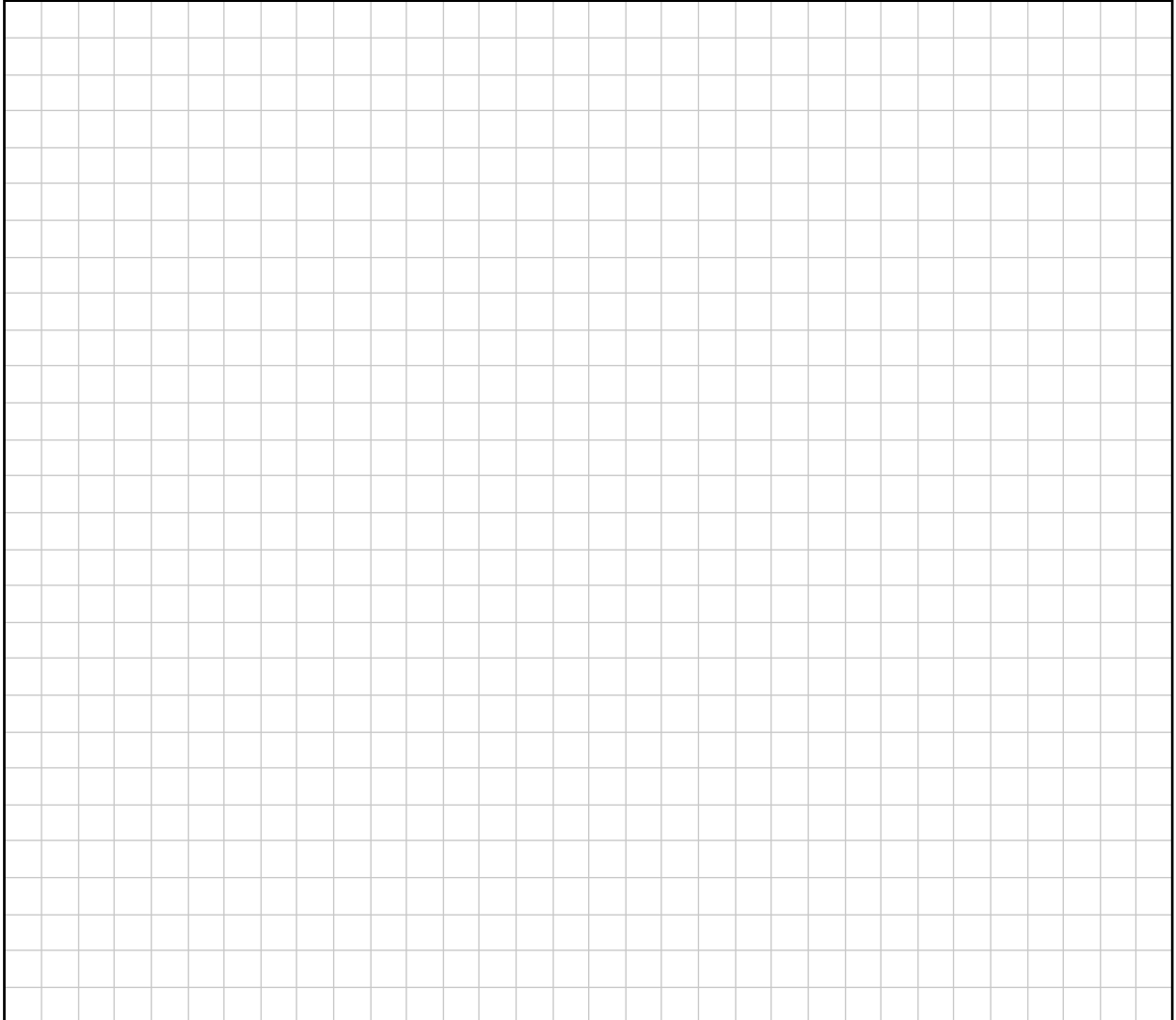
(i) By writing in the missing symbols, complete the inequality below to show this information, where A years is the age of a child.

$$4 \quad \boxed{} \quad A \quad \boxed{} \quad 12$$

(ii) Graph the inequality from part **(c)(i)** on the following number line for $A \in \mathbb{R}$, showing the allowable ages.

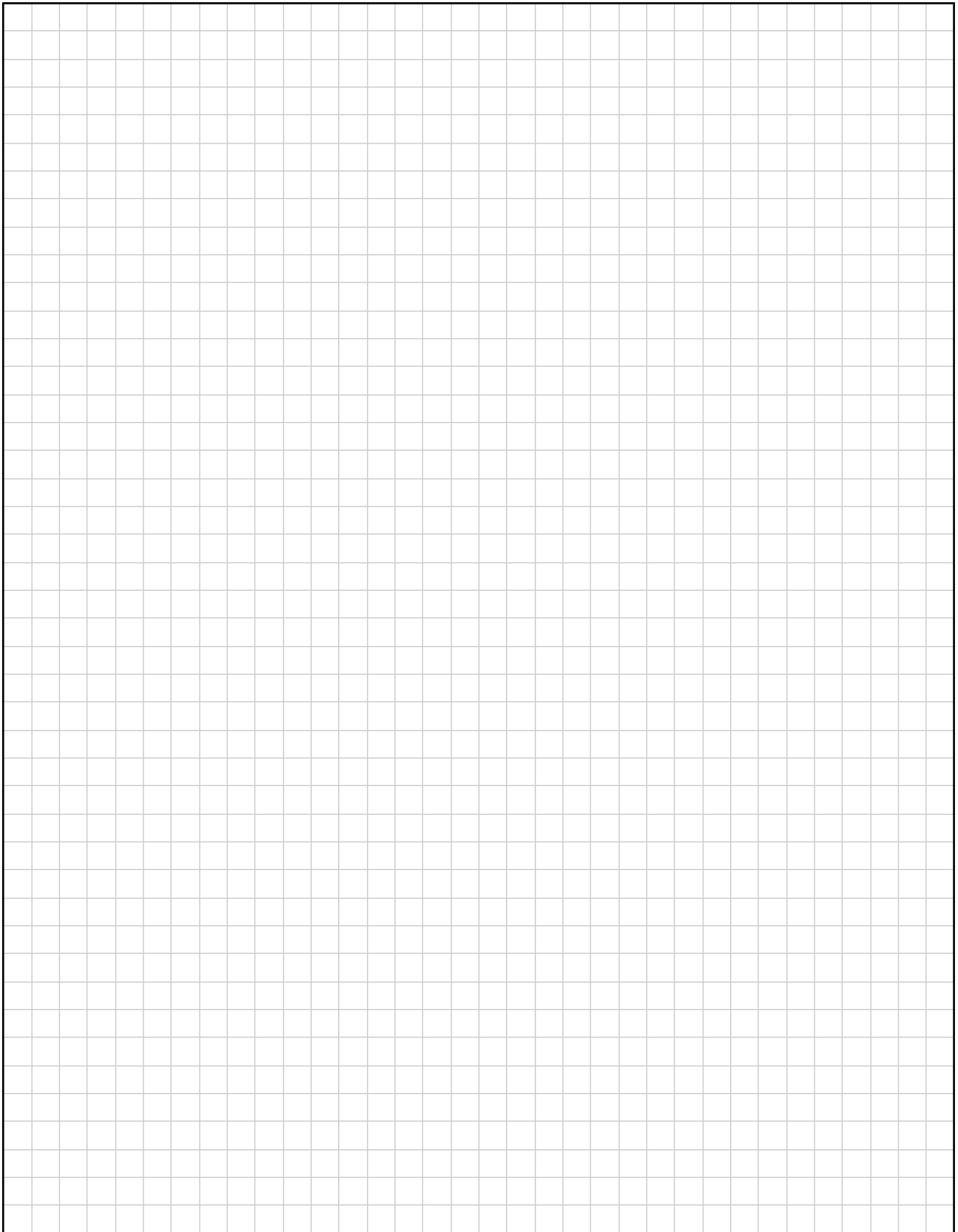


- (d) It takes 4 employees 13 hours working together to make a slide.
On a particular day, the 4 employees work together for 2 hours making a slide.
Then 1 employee leaves and the other 3 continue to finish making the slide.
Find how long it takes the remaining 3 employees to finish making the slide.
Assume that all employees work at the same rate.
Give your answer in hours and minutes.



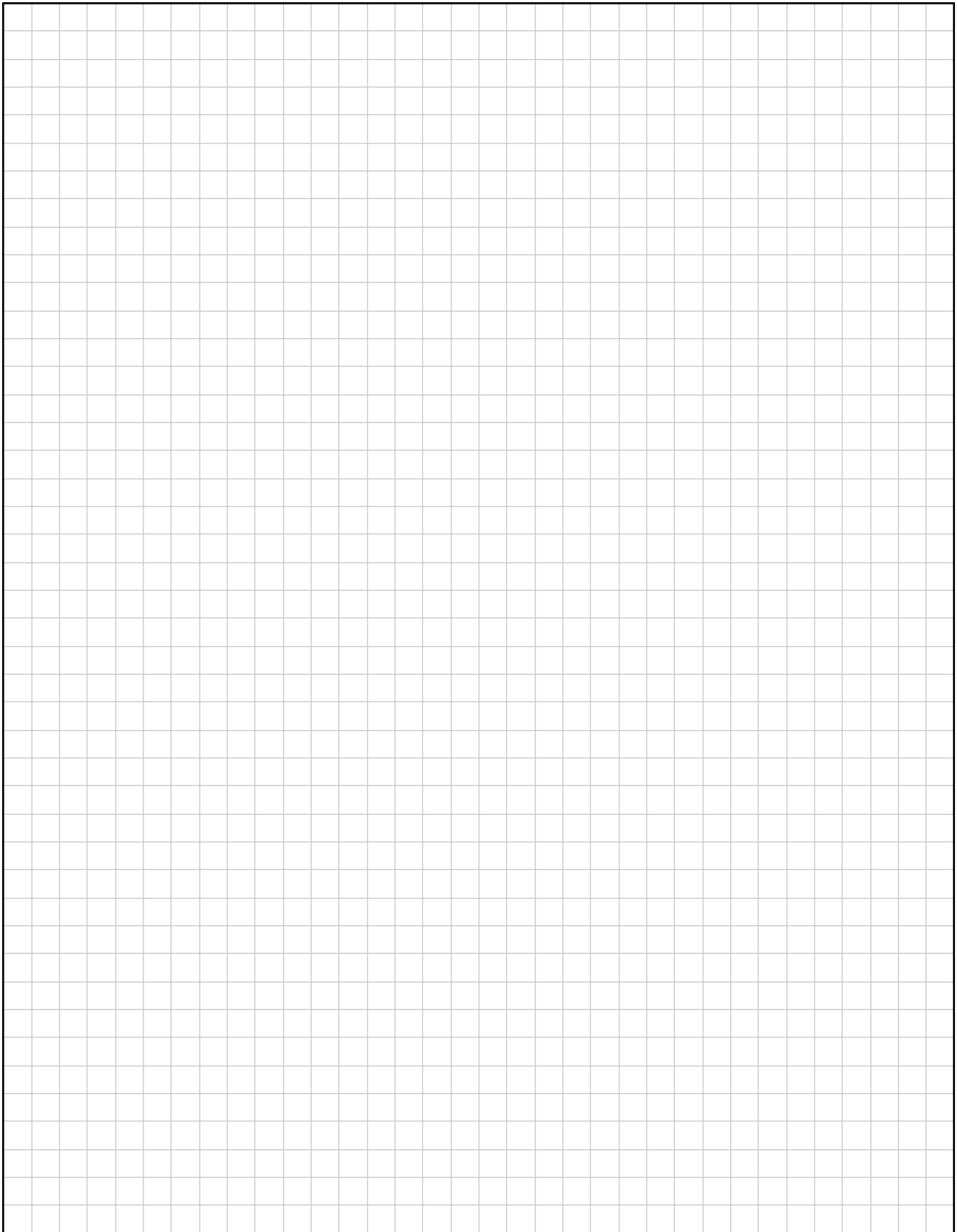
Page for extra work.

Label any extra work clearly with the question number and part.



Page for extra work.

Label any extra work clearly with the question number and part.



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Leaving Certificate – Ordinary Level

Mathematics - Paper 1

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