

FOR THE EXAMINER

EXAM. NUMBER:

Total
Marks:


Coimisiún na Scrúduithe Stáit State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2007

MATHEMATICS - ORDINARY LEVEL - PAPER 1 (300 marks)

THURSDAY, 7 JUNE - MORNING, 9:30 to 11:30

Time: 2 hours

Attempt **ALL** questions. Each question carries 50 marks.

Answers and supporting work should be written into the boxes provided.

Extra paper and graph paper can be obtained from the Superintendent, if needed.

The symbol indicates that supporting work must be shown to obtain full marks.

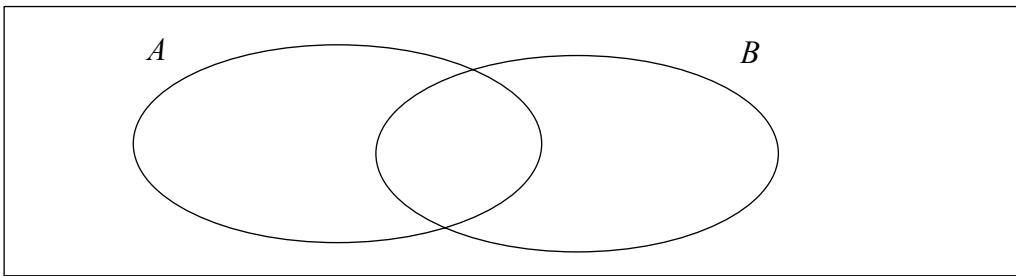
Make and model of calculator used:

For Superintendent/Examiner use only:

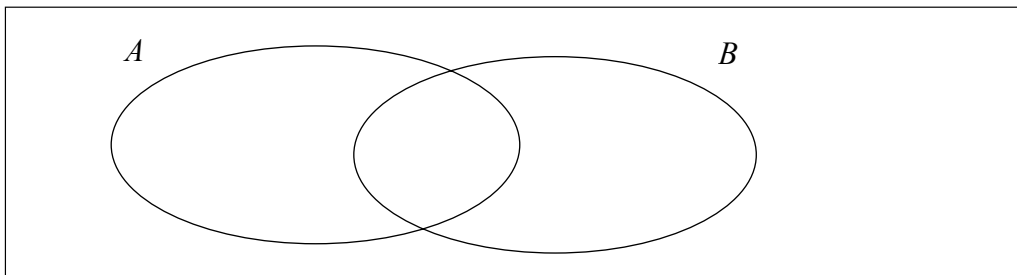
Centre Stamp

Question	Mark
1	
2	
3	
4	
5	
6	
Total	
Grade	

1. (a) (i) Using the Venn diagram below, shade in the region that represents $A \cup B$.



- (ii) Using the Venn diagram below, shade in the region that represents $A \cap B$.

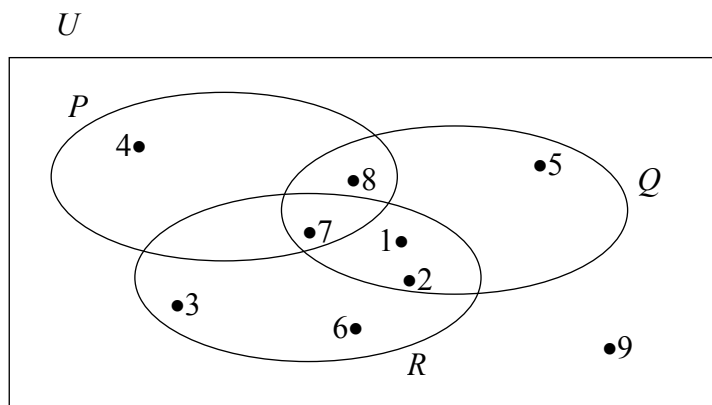


- 1(b) U is the universal set.

$$P = \{4, 7, 8\}$$

$$Q = \{1, 2, 5, 7, 8\}$$

$$R = \{1, 2, 3, 6, 7\}$$



List the elements of:

(i) $P \cup Q$

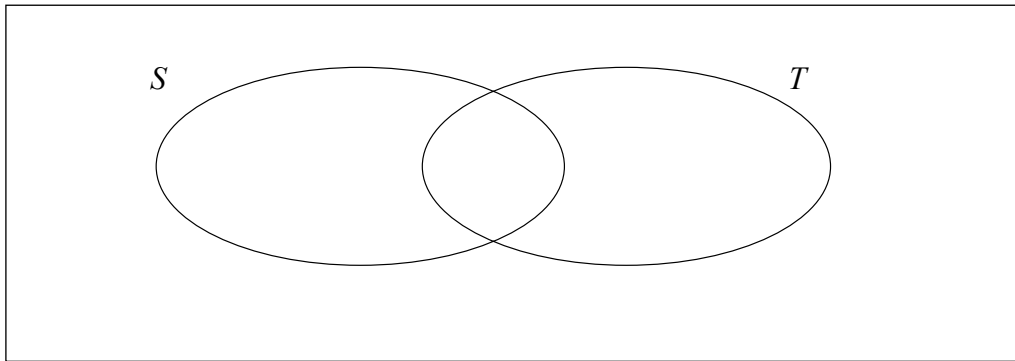
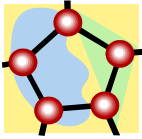
(ii) $P \setminus R$

(iii) $(P \cup R) \cap Q$

(iv) $(P \cup Q)'$

- 1(c)** In a class, all the students study Science (S) or Technical Graphics (T).
A number of the students study both of these subjects.
22 students study Science. 12 students study Technical Graphics.
8 study both subjects.

- (i)** Represent this information in the Venn diagram below.



- (ii)** How many students study Science only?

- (iii)** How many students are there in the class?

- (iv)** How many students study only one of the two subjects?

2. (a) €6650 was shared between Ciarán and Sheila in the ratio 2:5.
How much did each receive?



Ciarán = _____


Sheila = _____

- 2(b) (i) Simplify $\frac{a^8 \times a^{10}}{a^5 \times a^7}$, giving your answer in the form, a^n where $n \in \mathbf{N}$.



$$\frac{a^8 \times a^{10}}{a^5 \times a^7} =$$

- (ii) By rounding each of these numbers to the nearest whole number, estimate the value of $\frac{24 \cdot 092}{6 \cdot 1 - 2 \cdot 93}$.



$$\frac{24 \cdot 092}{6 \cdot 1 - 2 \cdot 93}$$
 is approximately equal to:

<input type="text"/>		<input type="text"/>		<input type="text"/>
<input type="text"/>	-	<input type="text"/>	=	<input type="text"/>
			=	<input type="text"/>

- (iii) Using a calculator, or otherwise, find the exact value of $\frac{24 \cdot 092}{6 \cdot 1 - 2 \cdot 93}$.

- 2(c)** (i) Using a calculator, or otherwise, find the exact value of $(2 \cdot 25)^{\frac{1}{2}}$.

$$(2 \cdot 25)^{\frac{1}{2}} =$$


- (ii) Using a calculator, or otherwise, multiply 54.5 by 60 and express your answer in the form $a \times 10^n$, where $1 \leq a < 10$ and $n \in \mathbf{N}$.



- (iii) Using a calculator, or otherwise, evaluate $(6 \cdot 9)^2 - \sqrt{139 \cdot 8} \div 3 \cdot 55$.
Give your answer correct to two decimal places.




- 3. (a)** In one week Bríd sent 26 text messages on her mobile phone.
 11 of these messages cost 8c each.
 The rest of the text messages cost 12c each.
 Find the total cost of Bríd's texting.



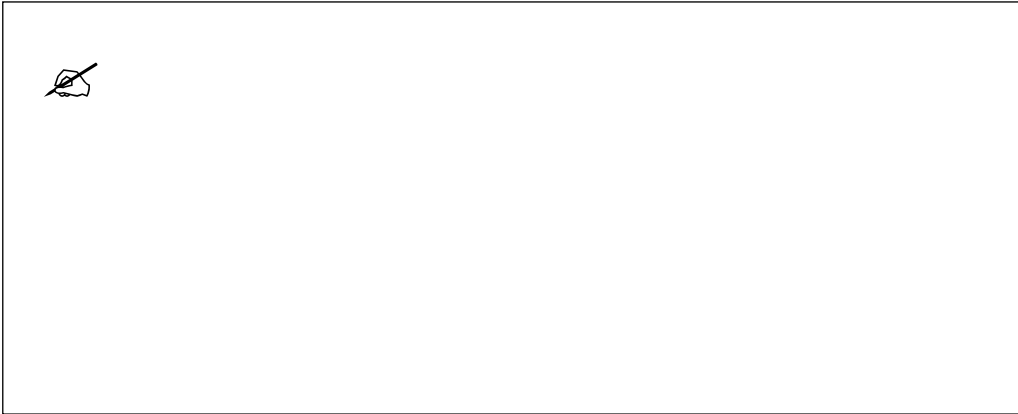
- 3(b) (i)** John's gross pay is €23 000. His tax credit is €3400.
 He pays income tax at the rate of 20%.
 Find John's take-home pay.



Gross Pay	€23 000
Tax @ 20%	
Tax Credit	€3400
Tax Due	
Take-home Pay	



- (ii) VAT at 21% is added to a bill of €255.
Calculate the total bill.

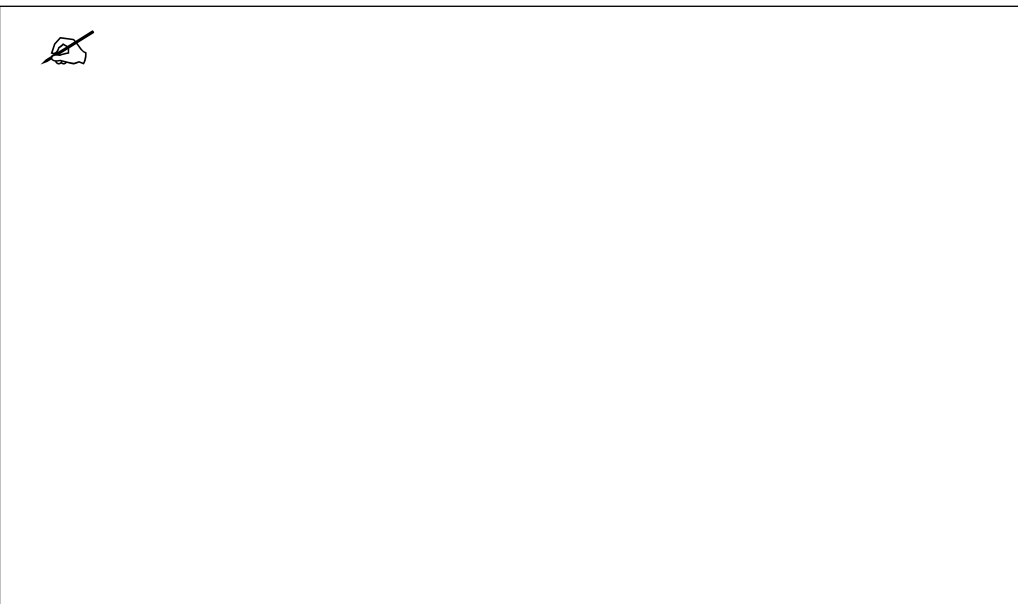
A large rectangular box for writing the answer to question (ii). In the top-left corner, there is a small icon of a hand holding a pencil, indicating where to start writing.

3(c)



- (i) €15 000 is invested at 3% per annum.
What is the amount of the investment at the end of the first year?

A large rectangular box for writing the answer to question 3(c)(i). In the top-left corner, there is a small icon of a hand holding a pencil, indicating where to start writing.

- (ii) €1450 is withdrawn from this amount at the beginning of the second year.
The interest rate for the second year is 3.5%.
What is the amount of the investment at the end of that year?

A large rectangular box for writing the answer to question 3(c)(ii). In the top-left corner, there is a small icon of a hand holding a pencil, indicating where to start writing.

4. (a) If $x = 3$, find the value of :


	(i) $4x + 5$
	(ii) $2x^2 - 11$

4(b) (i) Solve the equation $4(5x + 6) = 84$.



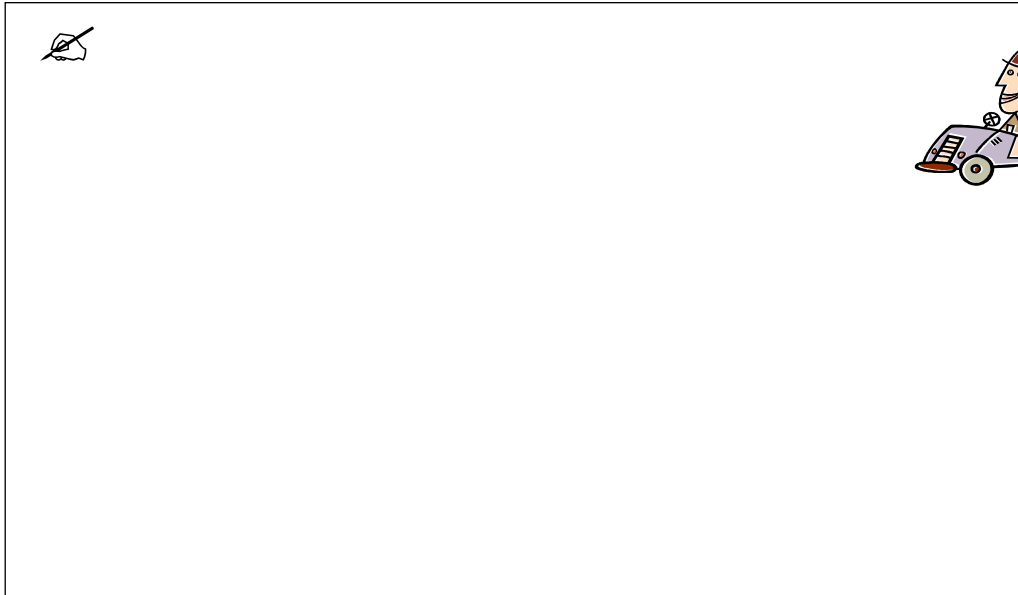
(ii) Write in its simplest form

$$3x^2 - 2x + 6 - x(2x - 3).$$



4(c)

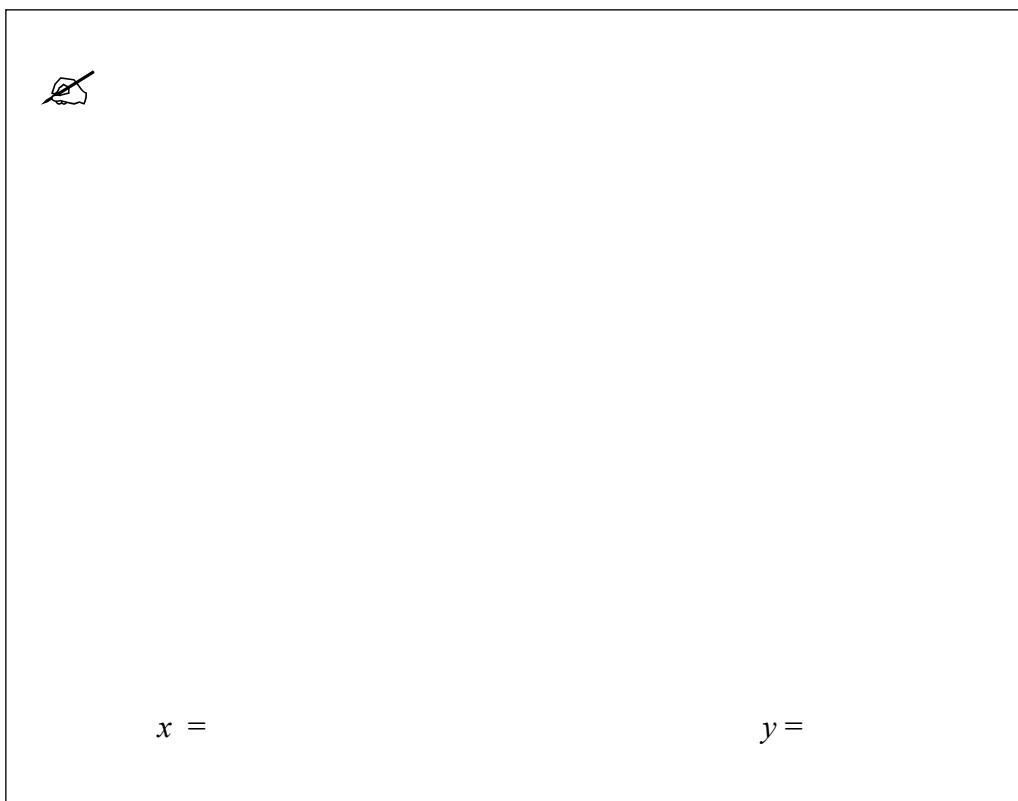
- (i) Liam drove from Town *A* to Town *B*, a distance of x km.
He then drove from Town *B* to Town *C*, a distance of $(2x + 1)$ km.
The total distance that he drove was 56 km.
Find the value of x , correct to the nearest kilometre.




- (ii) Solve for x and for y :

$$3x + 5y = 13$$

$$x + 2y = 5$$




5. (a) Find the values of x for which $3x + 2 < 11$, $x \in \mathbf{N}$.



- 5(b) (i) Factorise


(i) $16xy + 11y$

 (ii) $5x + 10y + ax + 2ay$

(iii) $x^2 - x - 90$


(iv) $x^2 - 121$

- 5(c)** (i) Express $\frac{2x-1}{5} + \frac{x+7}{2}$ as a single fraction. Give your answer in its simplest form.




A large empty rectangular box for writing the answer to part (i).

- (ii) Hence, or otherwise, solve the equation
- $$\frac{2x-1}{5} + \frac{x+7}{2} = 6.$$



A large empty rectangular box for writing the solution to part (ii).

- (iii) Solve the equation
- $$x^2 + 5x - 36 = 0.$$



A large empty rectangular box for writing the solution to part (iii).

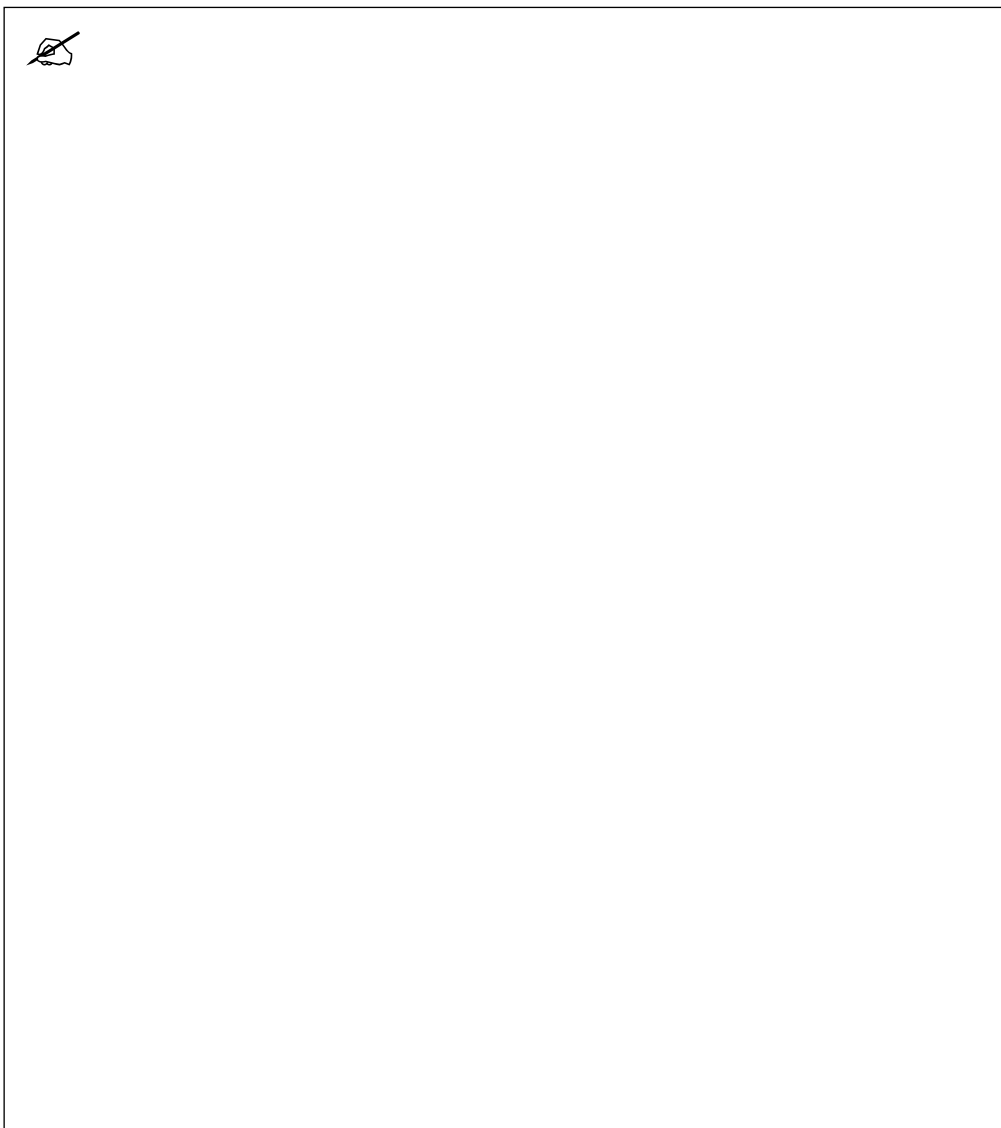
- 6. (a)** $P = \{(1,3) (4,6) (5,8) (7,9)\}$
Write out the domain and range of P .

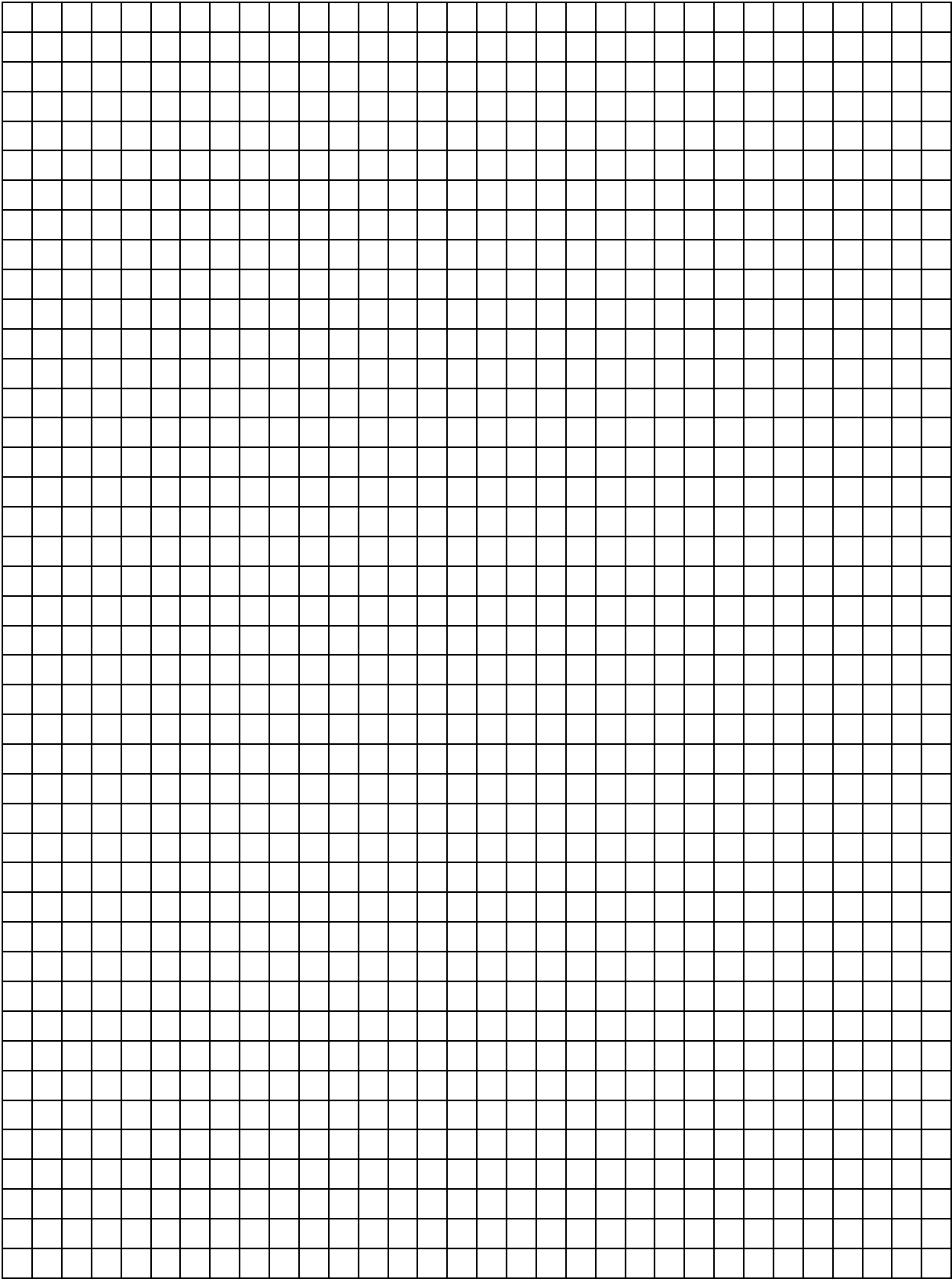
Domain =
Range =

- 6(b)** Draw the graph of the function

$$f: x \rightarrow 2 + 3x - x^2$$

in the domain $-1 \leq x \leq 4$, where $x \in \mathbf{R}$.





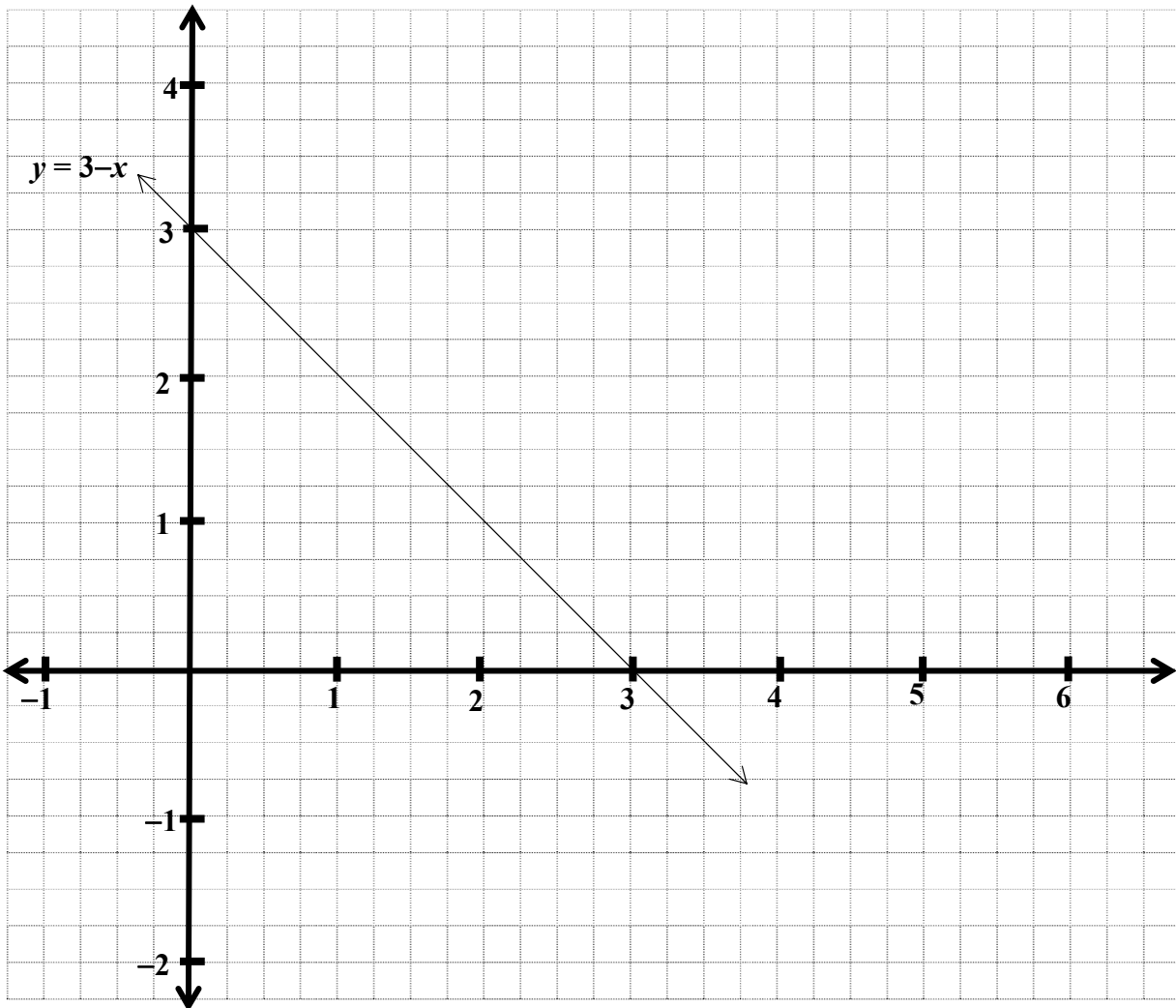
Part (c) on next page

- 6(c) (i) Given that $y = x + 1$, complete the table below.


x	0	1	2	3
y				

- (ii) On the grid below, the graph of the line $y = 3 - x$ is drawn.
Using your answers from (i), draw the graph of $y = x + 1$ on the same grid.

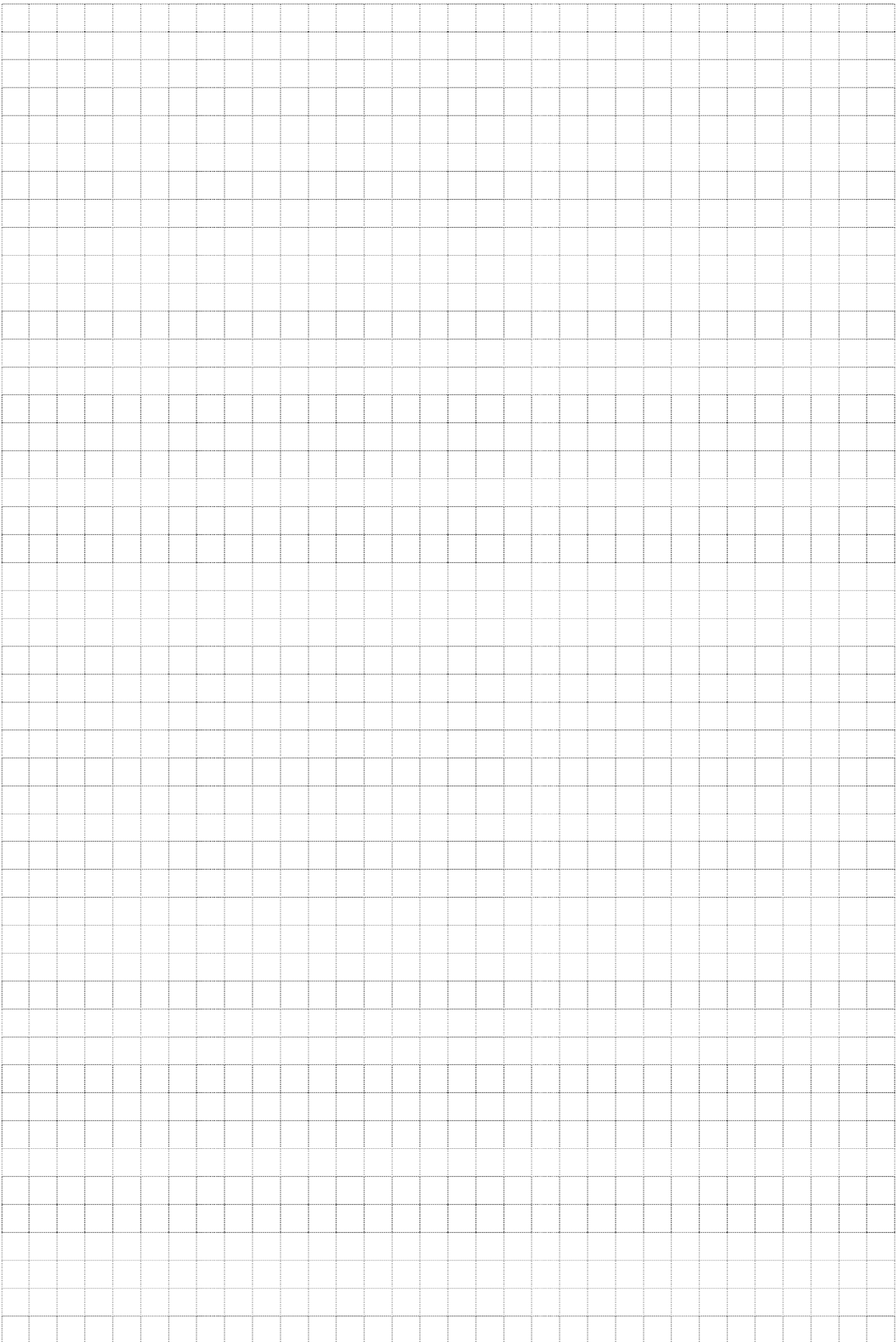
grid



- (iii) Use the graphs drawn in 6 (c) (ii) to write down the coordinates of the point of intersection of the two lines $y = 3 - x$ and $y = x + 1$.

 Answer to be written here.

Space for extra work



Space for extra work