



Coimisiún na Scrúduithe Stáit  
State Examinations Commission

Leaving Certificate Examination 2017

# Mathematics

Foundation Level

Friday 9 June      Afternoon 2:00 – 4:30

300 marks

Examination number
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Centre stamp
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Running total
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For examiner	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total	

Grade
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## Instructions

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

Section A	200 marks	8 questions
Section B	100 marks	2 questions

Answer **all ten** questions.

Write your answers in the spaces provided in this booklet. You may lose marks if you do not do so. There is space for extra work at the back of the booklet. You may also ask the superintendent for more paper. 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.

You will lose marks if you do not show all necessary work.

You may lose marks if you do not include appropriate units of measurement, where relevant.

You may lose marks if you do not give your answers in simplest form, where relevant.

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

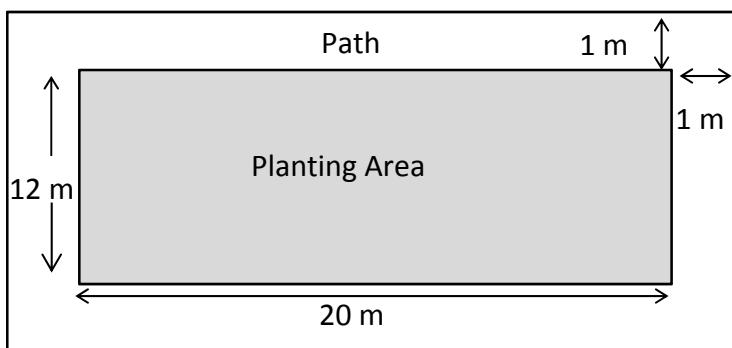
**Section A****200 marks**

Answer **all eight** questions from this section.

**Question 1****(25 marks)**

Dáithí is planning a new garden. The garden has a rectangular planting area, surrounded by a path. The planting area is 20 m long and 12 m wide. The path is 1 m wide.

A diagram of the garden is drawn below.



- (a)** Find the perimeter of the planting area.

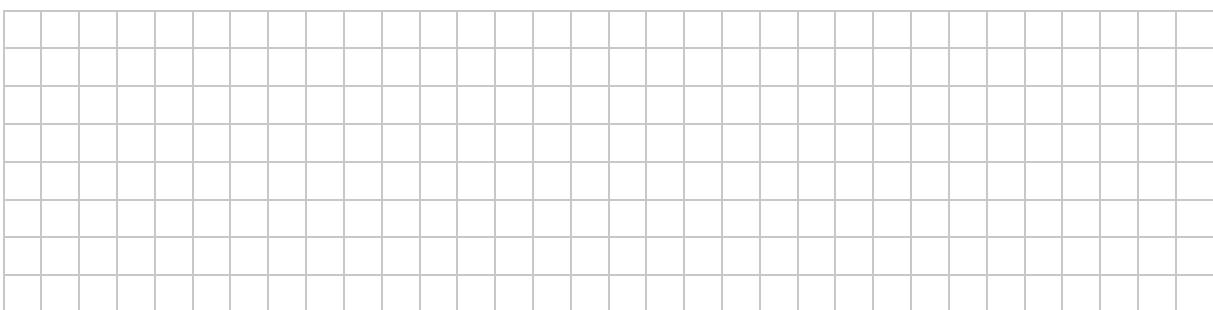
$$\text{Perimeter} = 12 + 20 + 12 + 20 = \quad \text{m}$$

- (b)** Find the area of the planting area.

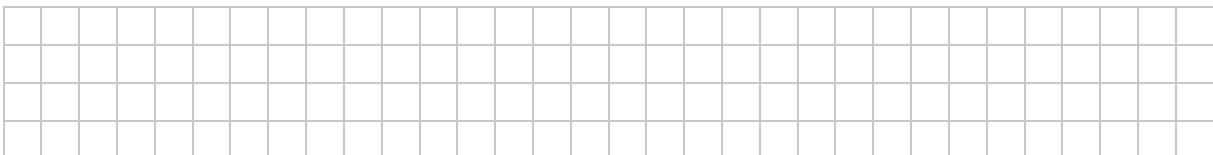
$$\text{Area} = 12 \times 20 = \quad \text{m}^2$$

- (c)** The path is 1 m wide.

- (i)** Find the total area of the garden including the path.



- (ii)** Hence, or otherwise, find the area of the path.



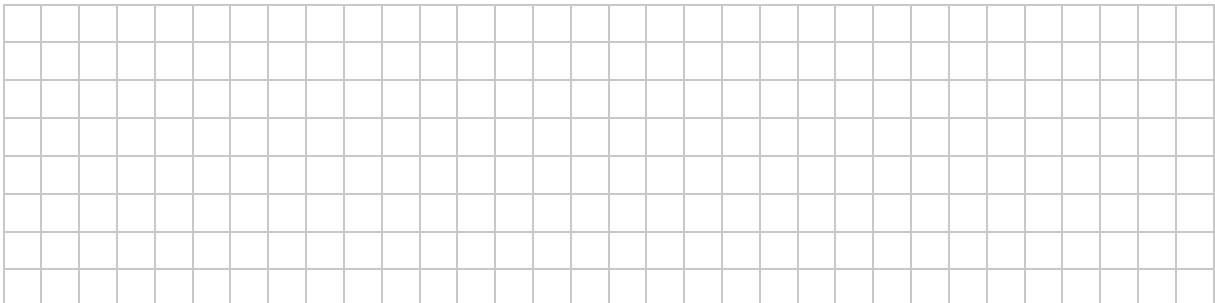
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**Question 2****(25 marks)**

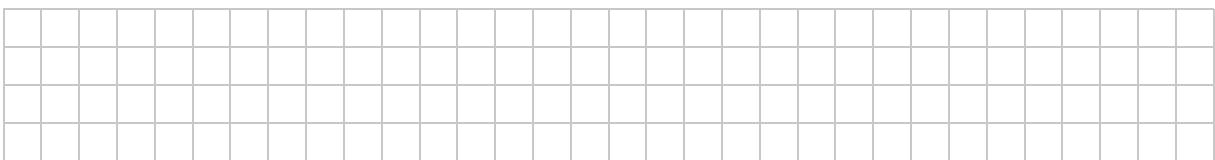
Here is a list of the ages, in years, of 11 children on a school soccer team:

10    12    9    11    12    12    10    9    11    12    10.

- (a) Find the mean age of the children. Give your answer correct to 1 decimal place.

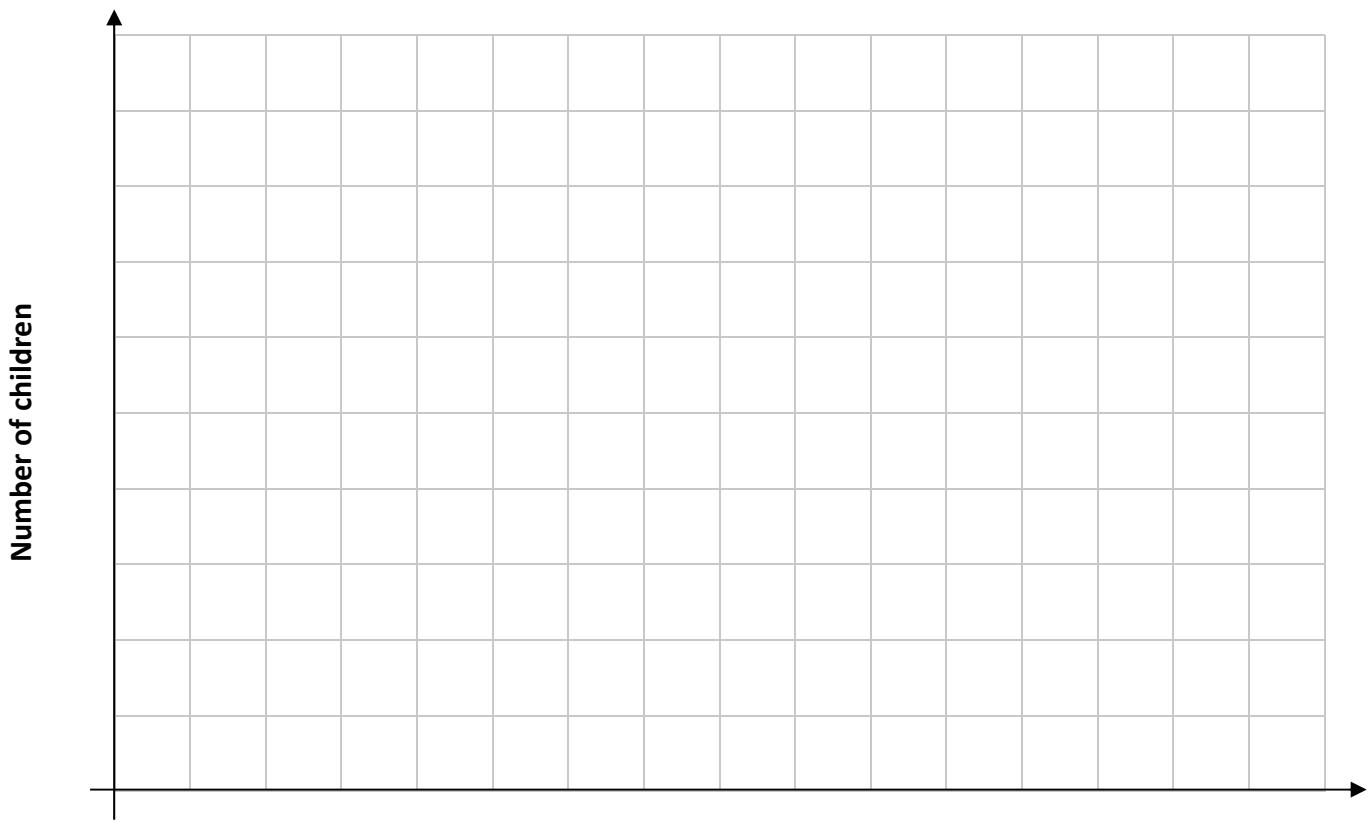


- (b) Find the range of the children's ages.



- (c) Use the data in the list above to complete the table **and** then draw a bar chart of the data using the axes provided.

Age (in years)	9	10	11	12
Number of children				



### **Question 3**

**(25 marks)**

Laoise earns €26 000 per year. She pays tax at the standard rate of 20%.

- (a) Find Laoise's gross tax.

- (b)** Laoise has a tax credit of €3300. Find her net tax.

- (c) Laoise also pays PRSI of €1040 and USC of €723. Find her take-home pay.

## Question 4

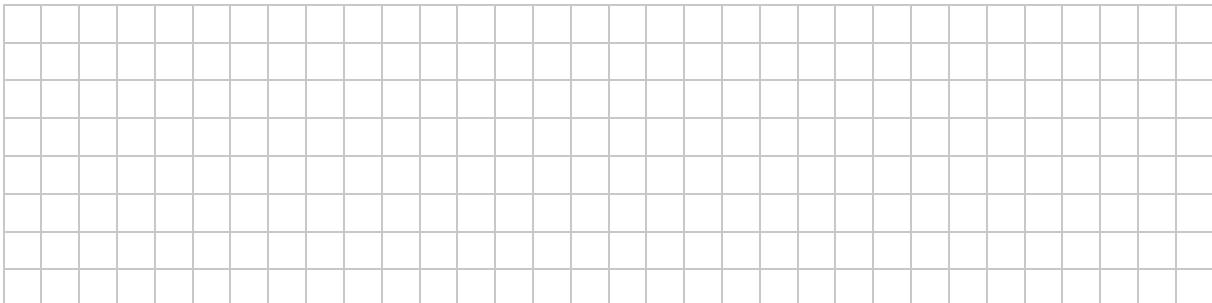
**(25 marks)**

Geraldine left home at 1:45 p.m. and drove to Longford. That took her 55 minutes. She stopped for a 15-minute break in Longford and then drove on to Westport.

- (a)** At what time did she leave Longford?

- (b)** The distance from Longford to Westport is 135 km.  
Her average speed for this part of the journey was 75 km/h.  
How long did it take her to go from Longford to Westport?  
Give your answer in hours and minutes.

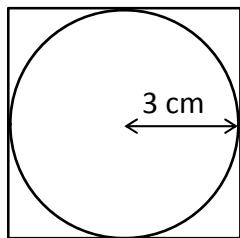
- (c) Later, Geraldine drove 135 km back to Longford.  
She stopped for a break when she had travelled  $\frac{3}{5}$  of the way.  
How many kilometres had she travelled when she took her break?

A rectangular grid consisting of 10 columns and 10 rows of small squares, intended for students to use for working out their answers.

## Question 5

**(25 marks)**

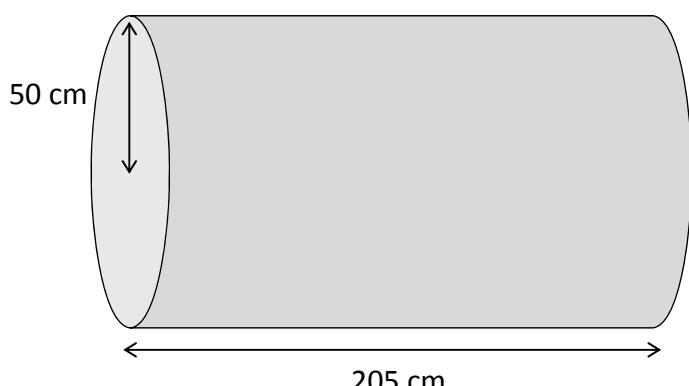
- (a)** A circular disc is cut out of a square piece of metal as shown below. The disc has a radius of 3 cm.



- (i) Find the area of the disc. Give your answer correct to 1 decimal place.

- (ii) Find the area of metal left after the disc has been removed.  
Give your answer in  $\text{cm}^2$ , correct to 1 decimal place.

- (b)** Conor has an oil tank in the shape of a cylinder.  
The length of the cylinder is 205 cm and the radius is 50 cm, as shown.



- (i) Find the capacity (volume) of the cylinder.  
Give your answer in litres, correct to the nearest litre.  
**(Note:**  $1000 \text{ cm}^3 = 1 \text{ litre}$ )

- (ii) Conor wants to fill his tank with oil.  
Oil costs 59 cent per litre.  
How much does it cost to fill the tank with oil?  
Give your answer correct to the nearest euro.

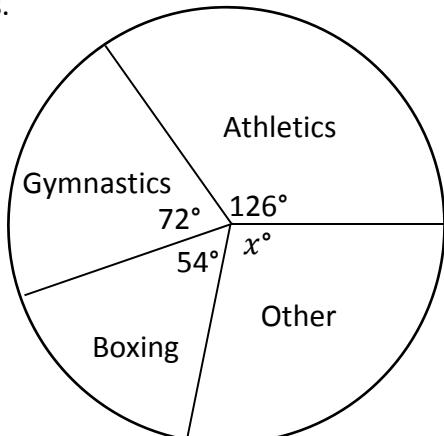
## Question 6

**(25 marks)**

- (a) Shane surveyed 240 people.

He asked them what their favourite Olympic sport was.

He then drew the pie chart shown, based on his results.



- (i) Find the value of  $x^\circ$ , the missing angle.  
Show all your working out.

- (ii) How many people said that gymnastics was their favourite sport?



- (iii) What percentage of people said boxing was their favourite sport?

- (b)** Lena is three years older than Rory. In 5 years' time their ages added together will be 49 years. What age is Rory now?

## Question 7

**(25 marks)**

Aisling has a stack of 10 cards with a number printed on one side of each card. The numbers used are

**1    2    2    2    3    4    4    5    5    6.**

She shuffles the cards, places them on a table with the number side down, and asks Joe to pick a card at random.

- (a) Find the probability that the number Joe picks is a 2.

- (b) Find the probability that the number Joe picks is an even number.

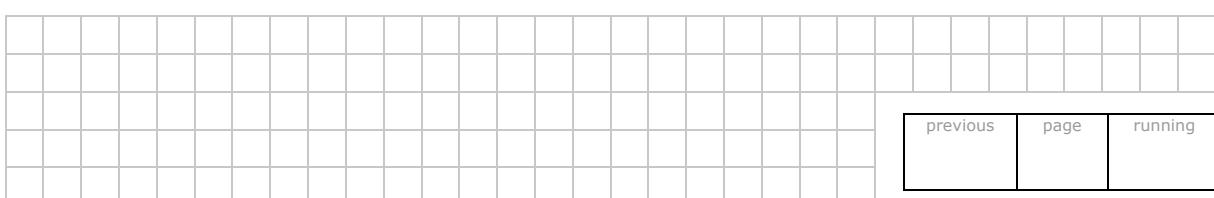
- (c) Find the probability that the number Joe picks is a 4 or a 5.

- (d) Aisling says: "The probability of picking an odd number is greater than the probability of picking an even number." Do you agree with Aisling? Give a reason for your answer.

- (e) A card is picked from the stack and not put back. It is a **4**.

A second card is then picked at random from the remaining cards.

What is the probability that this second card is a 4?

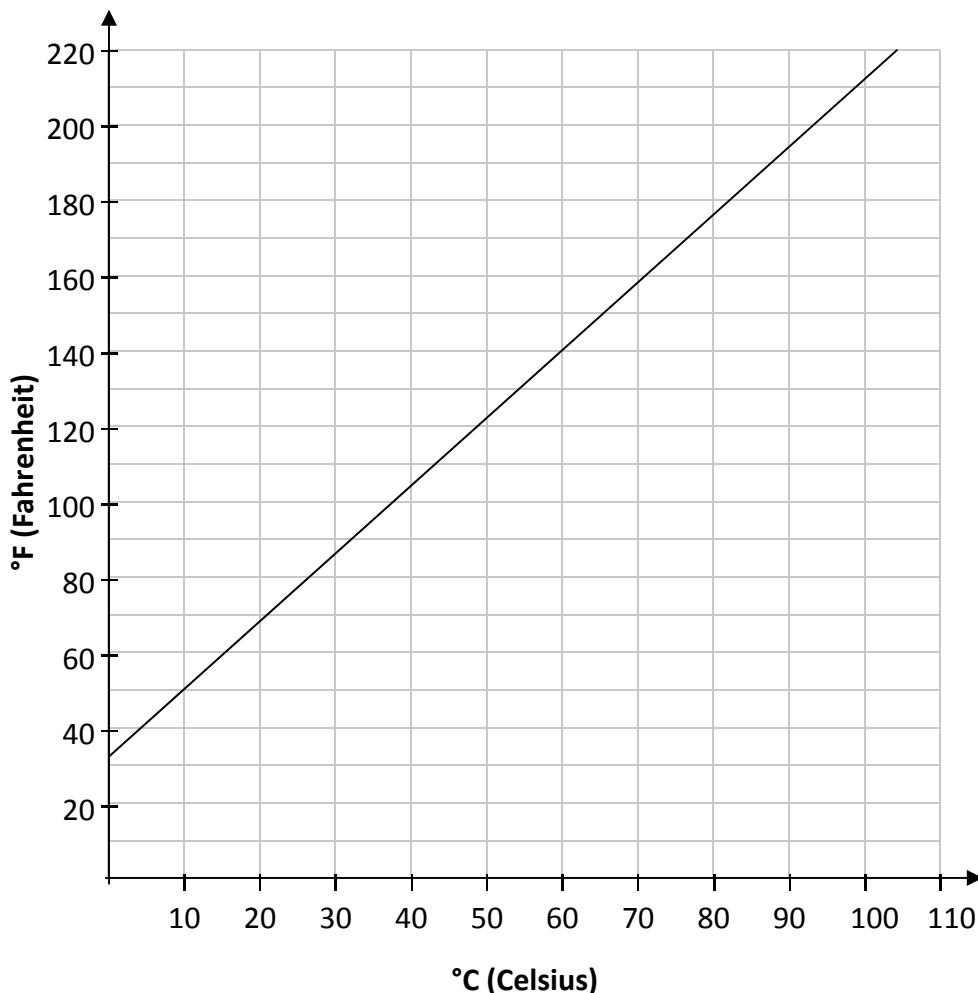


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## Question 8

(25 marks)

- (a)** The graph below shows the relationship between  $C$ , the temperature in  $^{\circ}\text{C}$  (Celsius) and  $F$ , the temperature in  $^{\circ}\text{F}$  (Fahrenheit).



- (i) Use the graph to find the value of  $60^{\circ}\text{C}$  in  $^{\circ}\text{F}$ .

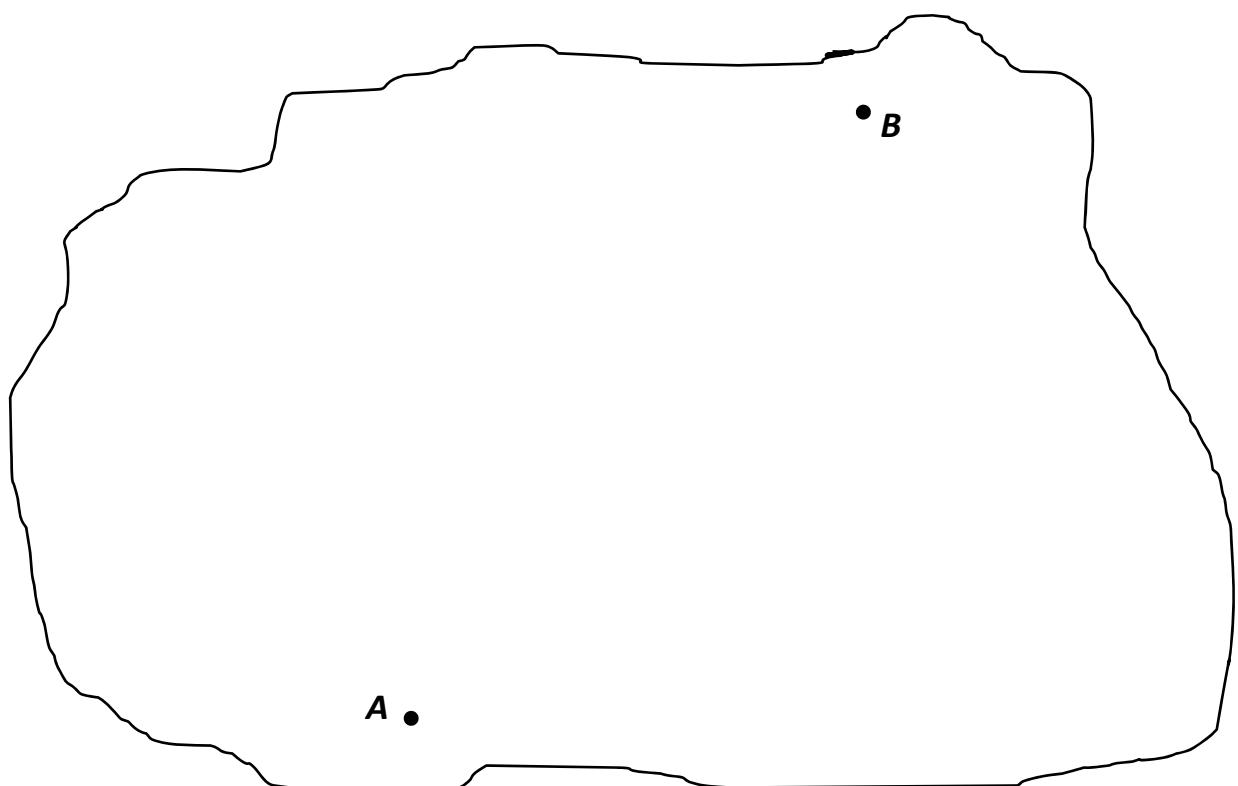
- (ii) Use the graph to find the value of  $50^{\circ}\text{F}$  in  $^{\circ}\text{C}$ .

- (iii) The formula below shows the relationship between  $C$  and  $F$ :

$$C = \frac{5(F - 32)}{9}.$$

Use the formula to show that 212°F is equivalent to 100°C.

- (b)** The map below shows 2 villages, **A** and **B**, in a part of a country in Africa. An Irish aid organisation wants to build a warehouse from which to serve the two villages. The warehouse should be less than 60 km from **A** and less than 80 km from **B**. Using your compass, draw **and** shade in the region on the map where the warehouse could be built.



Scale: 1 cm represents 10 km

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## Section B

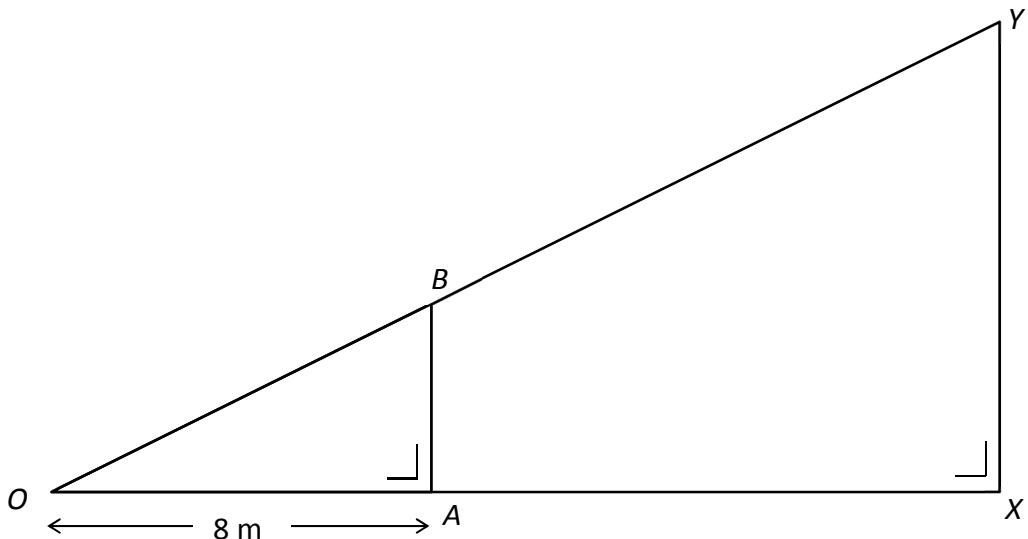
**100 marks**

Answer **Question 9** and **Question 10** from this section.

## Question 9

(50 marks)

- (a)** The diagram below shows a plan of part of a yard. The triangle  $OXY$  is the image of the right-angled triangle  $OAB$  by an enlargement of centre  $O$  and scale factor  $k = 2.5$ .



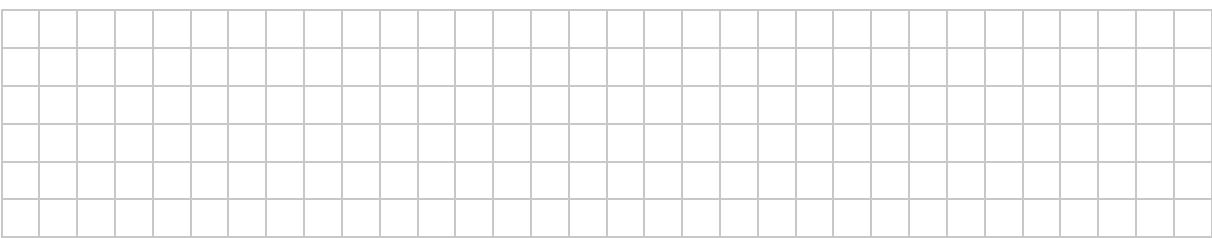
- (i) Given that  $|OA| = 8$  m, find  $|OX|$ .

- (ii) Given that  $|AB| = 6$  m, use Pythagoras' Theorem to calculate  $|OB|$ .

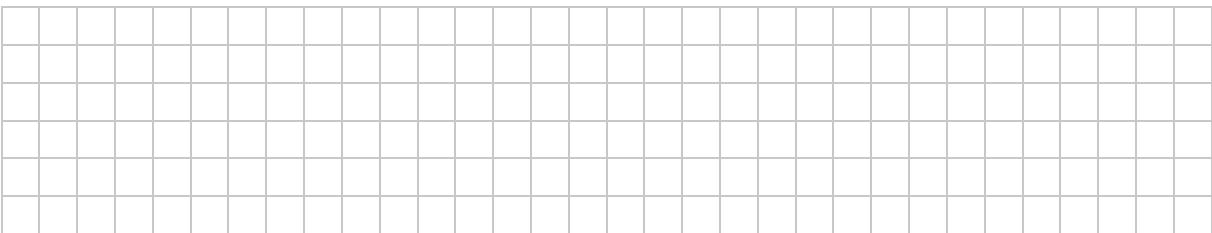
- (iii) Find the area of the triangle  $OAB$ .

A cartoon illustration of a man with glasses and a mustache, wearing a dark shirt, sitting at a desk and working on a computer. He is looking at a monitor and holding a keyboard. The background shows shelves with books and papers. The word "MAXON" is visible above the monitor.

**(iv)** Find the area of the triangle  $OXY$ .

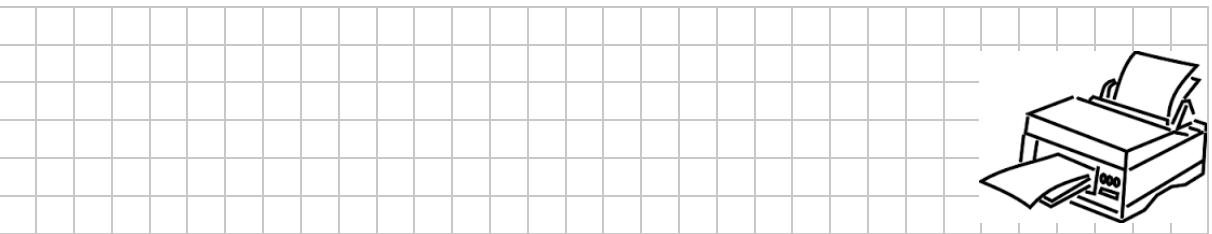


**(v)** Hence, or otherwise, find the area of the shape  $AXYB$ .



**(b)** One sheet of paper is 0.0085 cm thick.

**(i)** Write  $0.0085$  in the form  $a \times 10^n$ , where  $1 \leq a < 10$  and  $n \in \mathbb{Z}$ .



**(ii)** Carla wants to put 500 sheets of this paper into the paper tray of a printer.

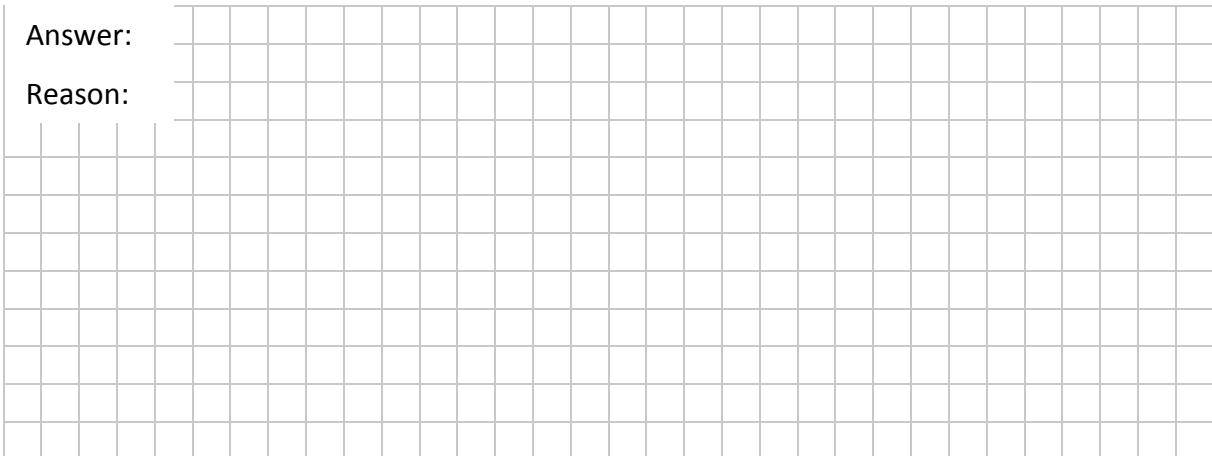
The tray is 4 cm deep.

Is the tray deep enough to hold all 500 sheets of paper?

Give a reason for your answer.

Answer:

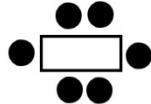
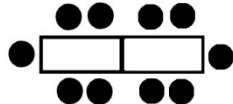
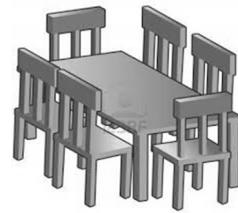
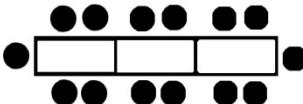
Reason:



**Question 10****(50 marks)**

The following diagram shows an arrangement of tables and chairs in a sequence of patterns.

Note:  = table, and  = chair

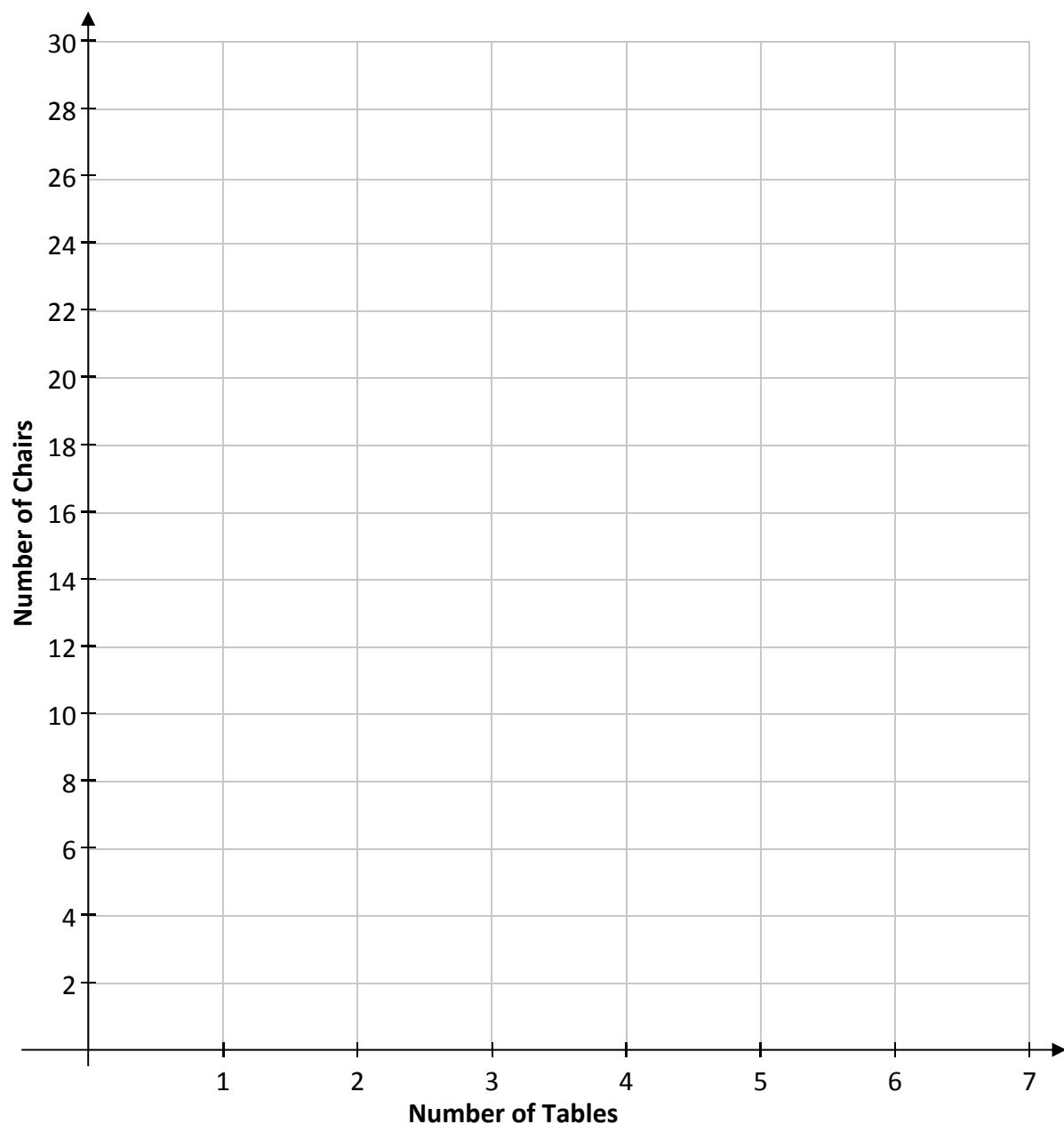
1<sup>st</sup> Pattern2<sup>nd</sup> Pattern3<sup>rd</sup> Pattern

- (a) Draw the 4<sup>th</sup> pattern in the sequence.

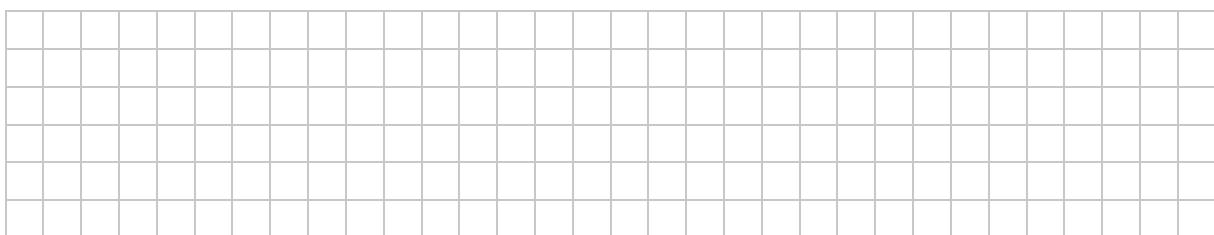
- (b) Complete the table below to show the number of chairs in each of the first 6 patterns.

Number of Tables	Number of Chairs
1	6
2	
3	
4	
5	
6	

- (c) Use your data from **part (b)** to graph the relationship between the number of tables and the number of chairs.



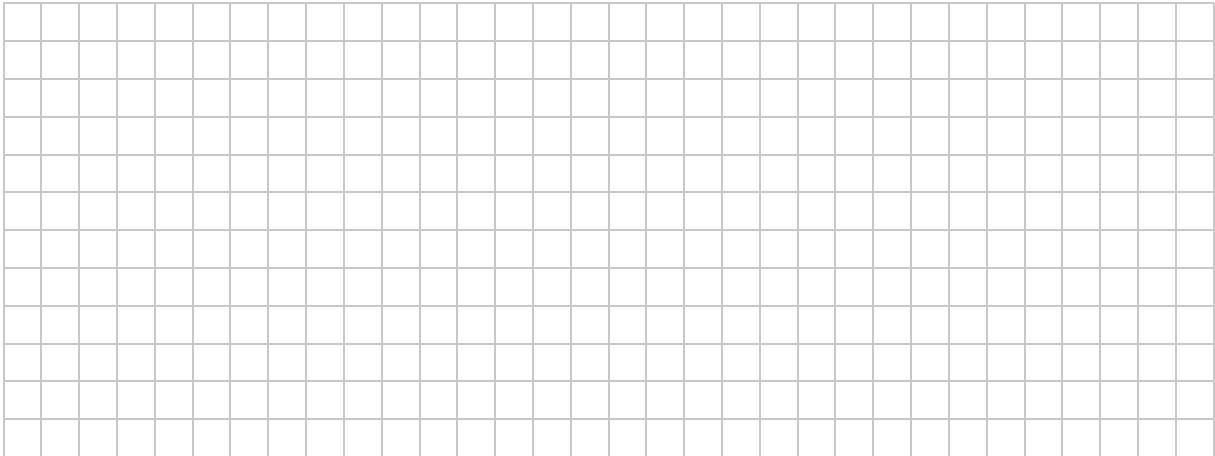
- (d) How many chairs are there in the 10<sup>th</sup> pattern?



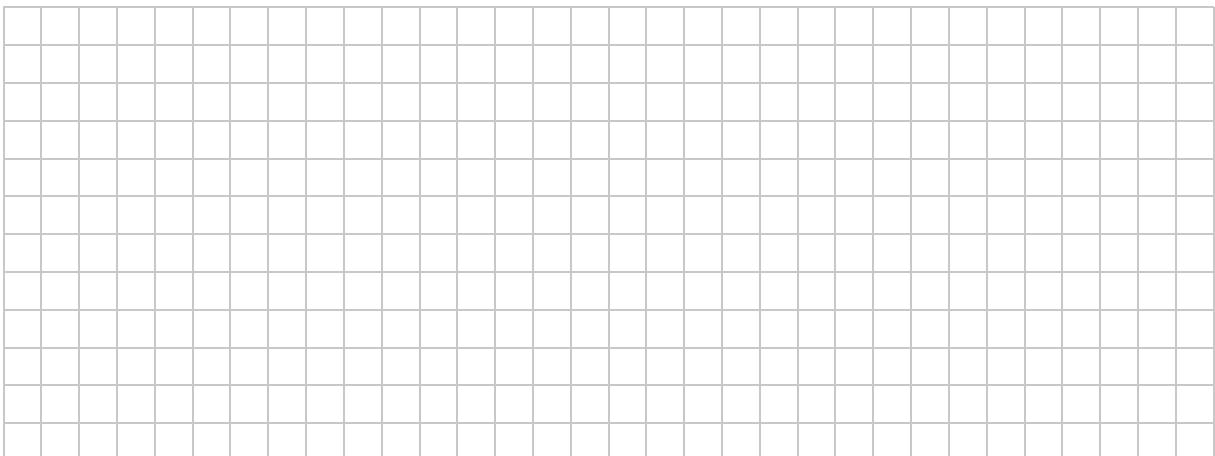
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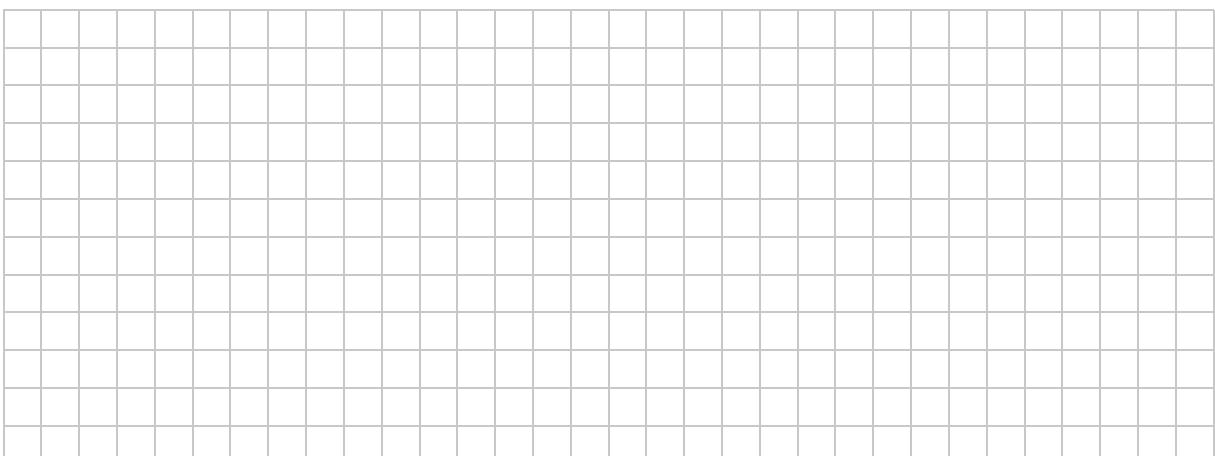
- (e) There are exactly 54 chairs in one of the patterns. How many tables are in that pattern?



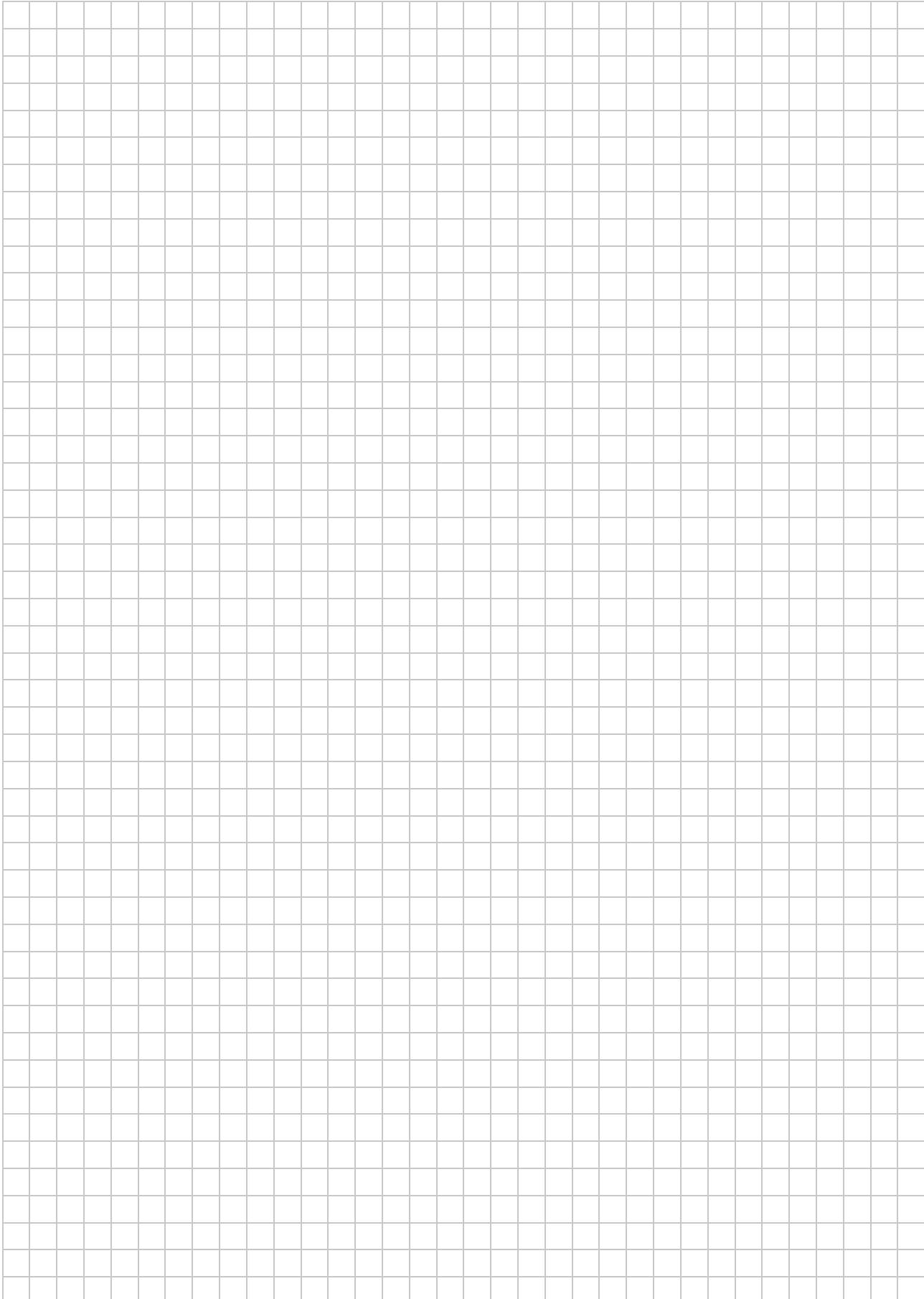
- (f) How many chairs, in total, are there in the first 7 patterns?



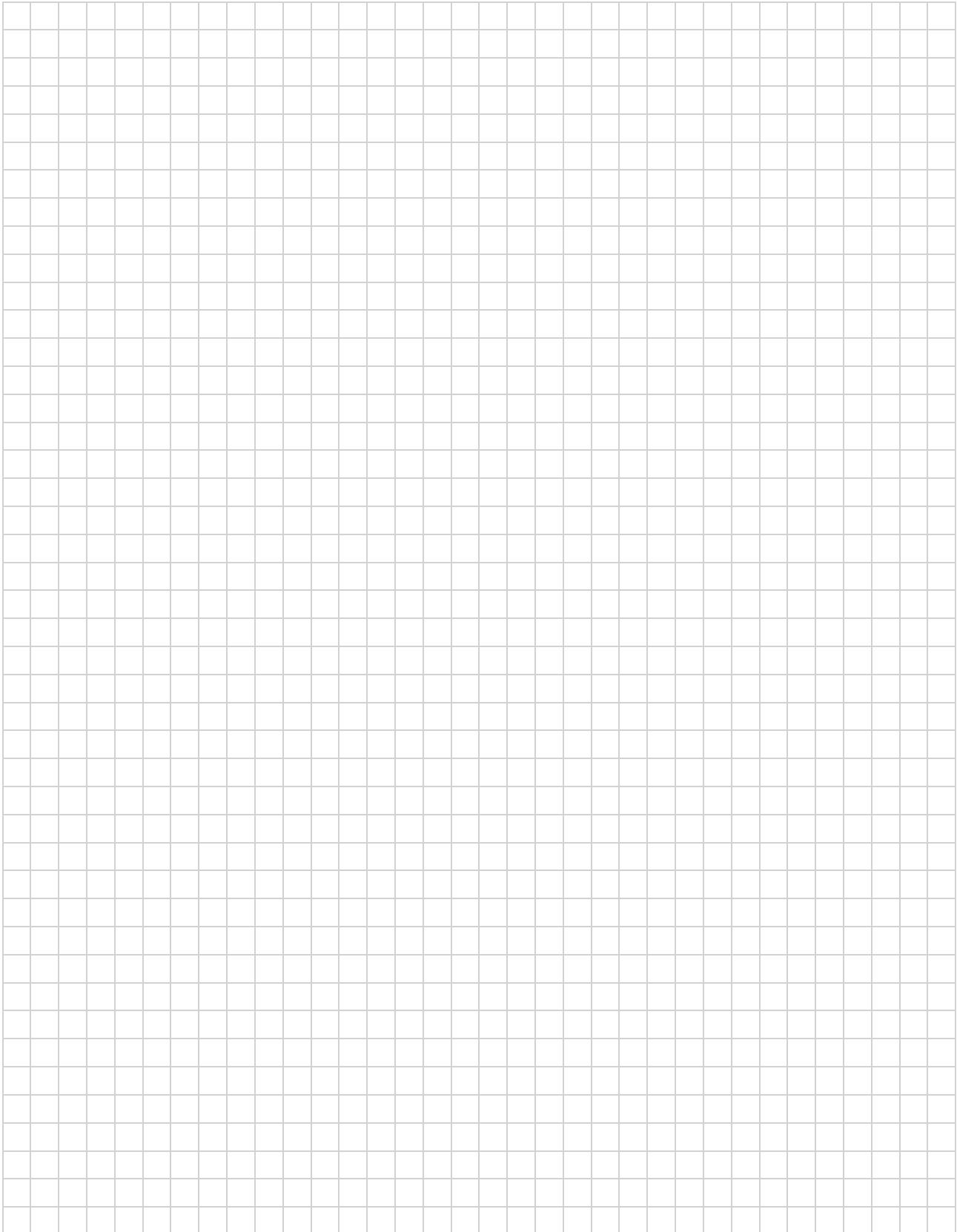
- (g) Write a formula (in words) that shows the relationship between the number of chairs and the number of tables in any given pattern.



You may use this page for extra work.



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Leaving Certificate 2017 – Foundation Level

## **Mathematics**

Friday 9 June

Afternoon 2:00 – 4:30