



Coimisiún na Scrúduithe Stáit  
State Examinations Commission

Leaving Certificate Examination 2015

# Mathematics

Foundation Level

Friday 5 June              Afternoon 2:00 – 4:30

300 marks

|                    |
|--------------------|
| Examination number |
|--------------------|

|              |
|--------------|
| Centre stamp |
|--------------|

|               |  |
|---------------|--|
| Running total |  |
|---------------|--|

| For examiner |      |
|--------------|------|
| Question     | Mark |
| 1            |      |
| 2            |      |
| 3            |      |
| 4            |      |
| 5            |      |
| 6            |      |
| 7            |      |
| 8            |      |
| 9            |      |
| 10           |      |
| Total        |      |

|       |
|-------|
| Grade |
|-------|

## **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 all necessary work is not clearly shown.**

**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:

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

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

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

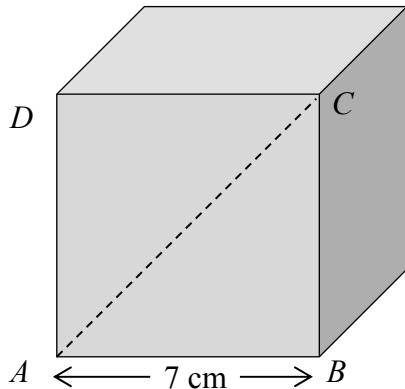
- (a) The diagram shows a cube with 7 cm sides.

- (i) Find the volume of the cube.

$$7^3 = \underline{\hspace{2cm}} \text{ cm}^3$$

- (ii) Find the length of the diagonal  $[AC]$ , correct to one decimal place.

$$\sqrt{7^2 + 7^2} = \underline{\hspace{2cm}} \text{ cm}$$



- (b) Which number in the list below does **not** have the same value as the other three numbers?  
Give a reason for your answer.

0.25

$\frac{1}{4}$

2.5

25%

Answer:

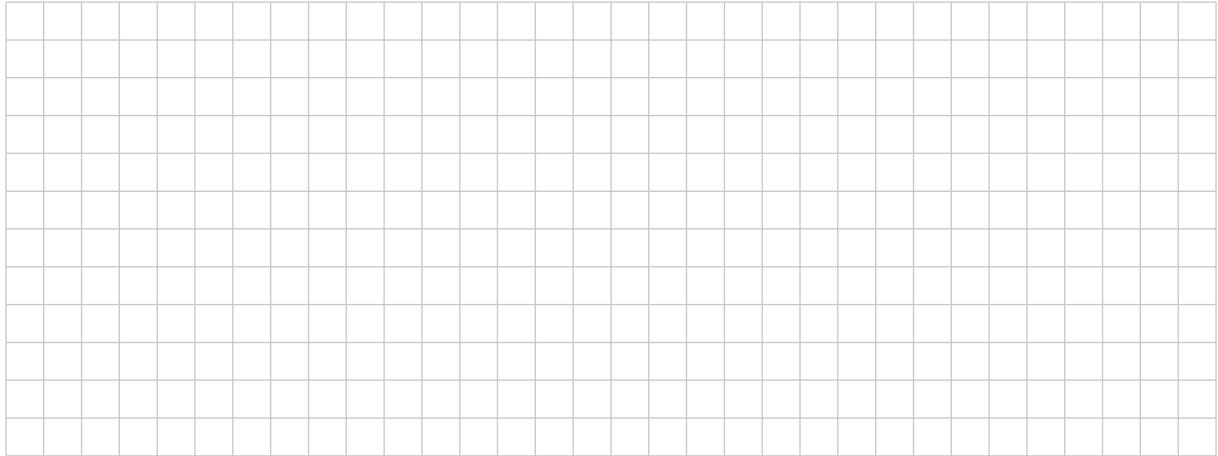
Reason:

- (c) Aoife buys an item on eBay for €45 and later sells it for €63.  
Calculate her profit as a percentage of the cost price.

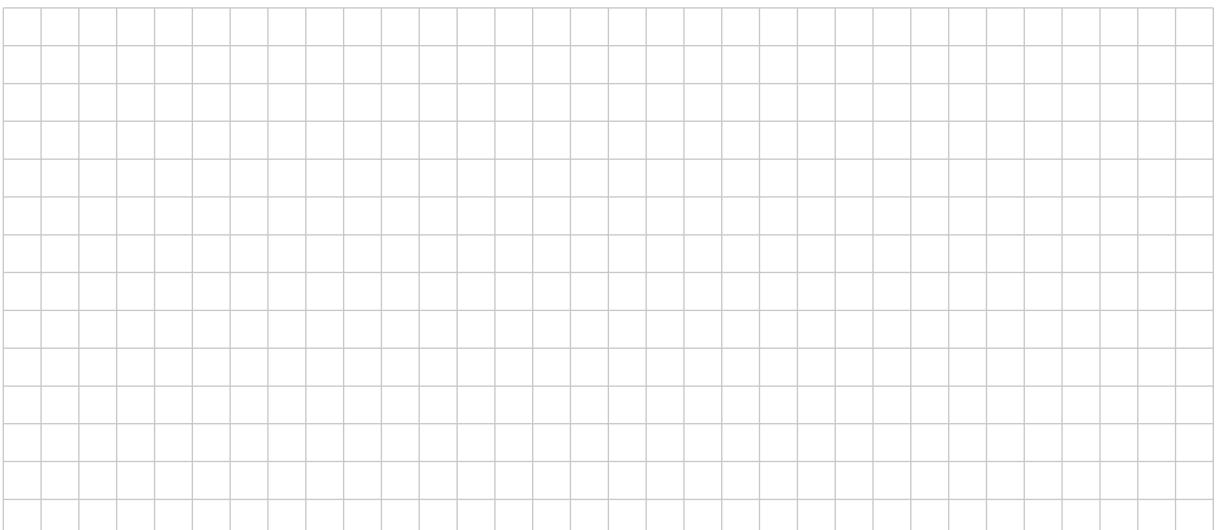
|      |         |
|------|---------|
| page | running |
|------|---------|

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

- (a) Conor earns €32 000 per year. He pays income tax at a rate of 20%. Conor has tax credits of €3300. Find the amount of income tax that Conor pays.



- (b) Coffee is sold in two different sized jars. Jar A contains 200 g and is sold at €5.80 per jar. Jar B contains 150 g and is sold at €4.65 per jar. Which jar is the best value for money? Give a reason for your answer.



Answer:

Reason:



**Question 3****(25 marks)**

All of the digits 5, 3, 6, and 1 are used to write down a four-digit whole number. Each digit is used only once.

- (a) (i) What is the biggest four-digit number that can be written?

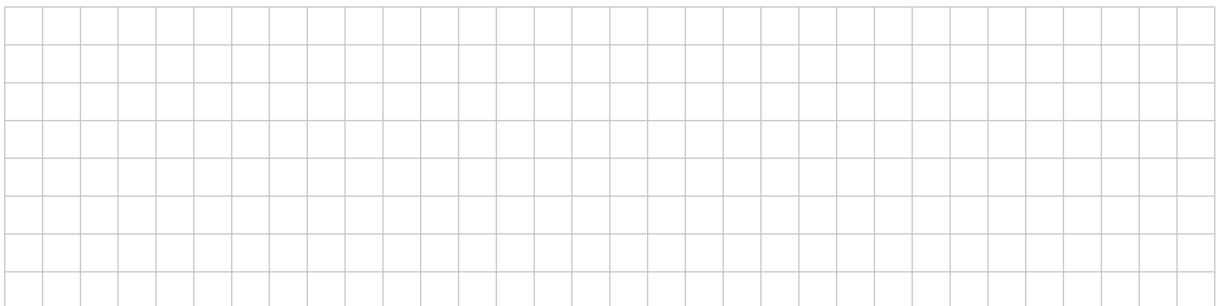
Answer: \_\_\_\_\_

- (ii) What is the smallest four-digit number that can be written?

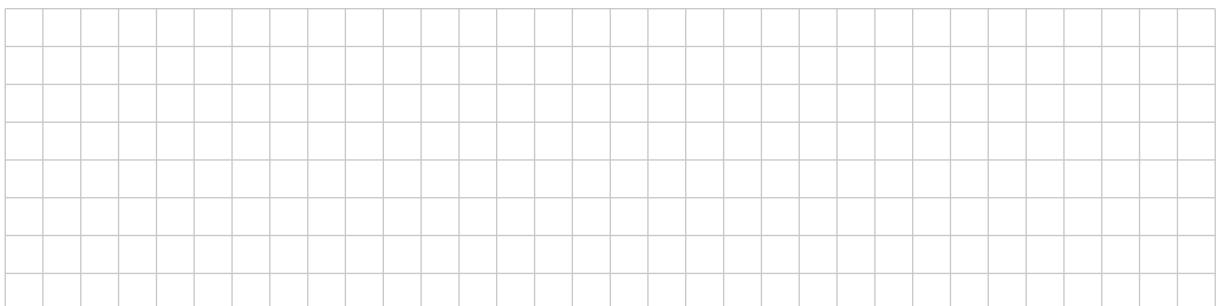
Answer: \_\_\_\_\_

- (b) Shane is driving from Cavan to Belfast. The journey is estimated to be 162 km. He travels at an average speed of 72 km/h.

- (i) How long will it take him to get there? Give your answer in hours and minutes.



- (ii) Shane leaves Cavan at 2:55 p.m. What time should he expect to arrive in Belfast?



- (iii) Shane's car uses 1 litre of petrol for every 15 km travelled. A litre of petrol costs 149·9 cent.

Find the cost of the petrol used on the journey.  
Give your answer in euro and cent.

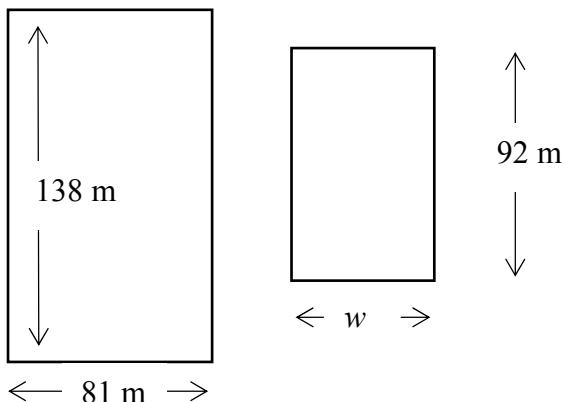


|      |         |
|------|---------|
| page | running |
|------|---------|

**Question 4****(25 marks)**

A local park has two pitches; one for seniors, the other for juveniles. The senior pitch is an enlargement of the juvenile pitch. The scale factor is  $k$  ( $k > 1$ ).

- (a) Construct the centre of the enlargement on the diagram below and label it  $O$ .



- (b) Find  $k$ , the scale factor of the enlargement.

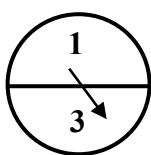
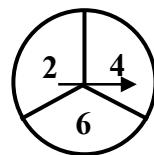
- (c) Find the value of  $w$ , the width of the juvenile pitch.

- (d) Find the ratio  $\frac{\text{area of senior pitch}}{\text{area of juvenile pitch}}$ .

## Question 5

(25 marks)

Each of two fair spinners is divided into sections as shown. The spinners are spun at the same time and the scores are then added.



- (a) Complete the table below to show all possible outcomes.

|                |   | First spinner |   |   |
|----------------|---|---------------|---|---|
|                |   | 2             | 4 | 6 |
| Second spinner | 1 |               |   |   |
|                | 3 |               | 7 |   |

- (b)** Find the probability of getting the following outcomes:

- (i) 3

- (ii) 3 or 9.

- (c) Caleb says “An outcome of 5 is as likely as an outcome of 7”. Is he correct? Give a reason for your answer.

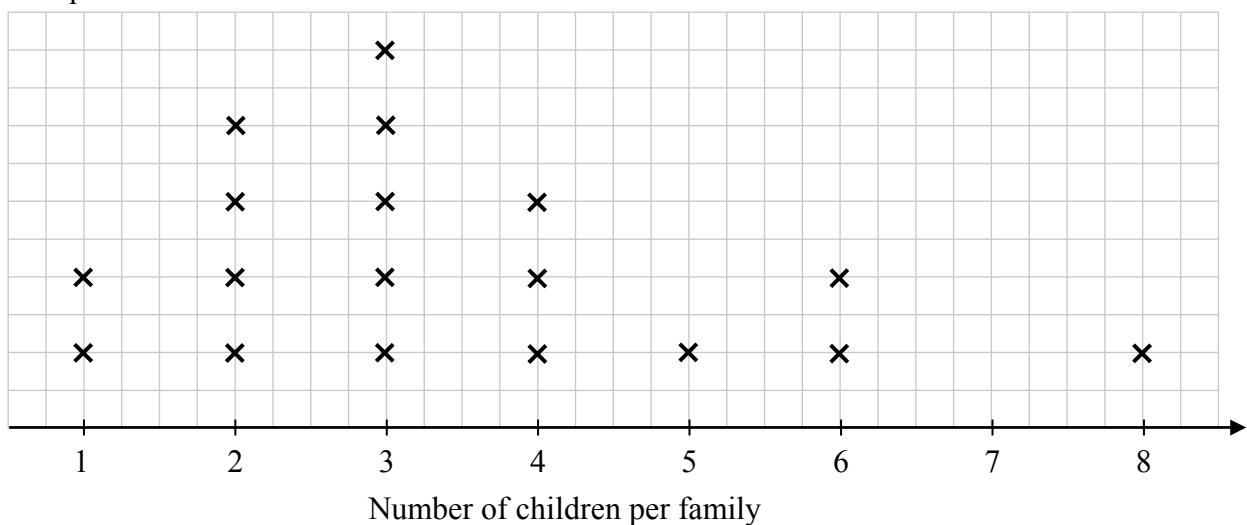
**Answer:**

Reason:

|      |         |
|------|---------|
| page | running |
|------|---------|

**Question 6****(25 marks)**

In a survey, 18 students were asked how many children are in their family. The results are shown in the line plot below.



- (a)** What is the mode of the data?

Mode = \_\_\_\_\_

- (b) (i)** Find the total number of children in the 18 families.

\_\_\_\_\_

- (ii)** Find the mean number of children per family, correct to one decimal place.

\_\_\_\_\_

- (c)** Which of the two numbers, the mode or the mean, do you think is the best single number to describe this data? Give a reason for your answer.

Answer:

Reason:

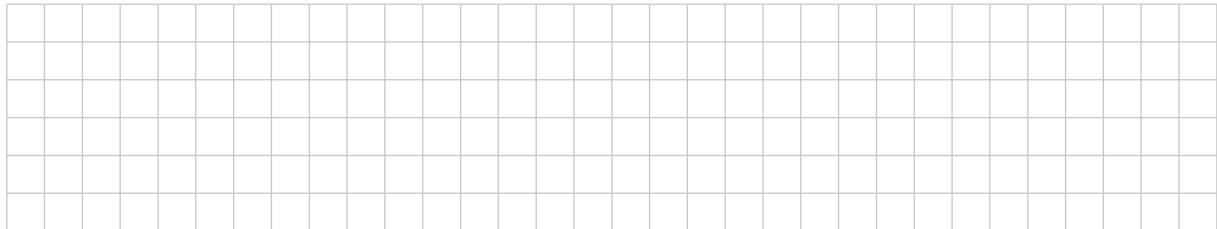
\_\_\_\_\_

**Question 7****(25 marks)**

- (a) (i) Mary creates a pattern of numbers using the instructions in the table below. The first number, 5, is filled in for you. Complete the table for the next three numbers.

| Instruction                 | First Number | Second Number | Third Number | Fourth Number |
|-----------------------------|--------------|---------------|--------------|---------------|
| Starting Number             | 5            | 6             | 7            | 8             |
| Multiply by 4               | $5 \times 4$ |               |              |               |
| Subtract 3 from your answer | $20 - 3$     |               |              |               |
| Outcome                     | 17           |               |              |               |

- (ii) Mary picks a starting number and using the instructions gets an outcome of 45.  
Find the number she picked.



- (b) A, B, and C are whole numbers. The numbers are placed in rows and added together as shown in the table.

| Row   | Numbers     | Total |
|-------|-------------|-------|
| Row 1 | $A + A + A$ | = 21  |
| Row 2 | $A + A + B$ | = 23  |
| Row 3 | $A + B + C$ | = 18  |

Find the value of A, of B, and of C.



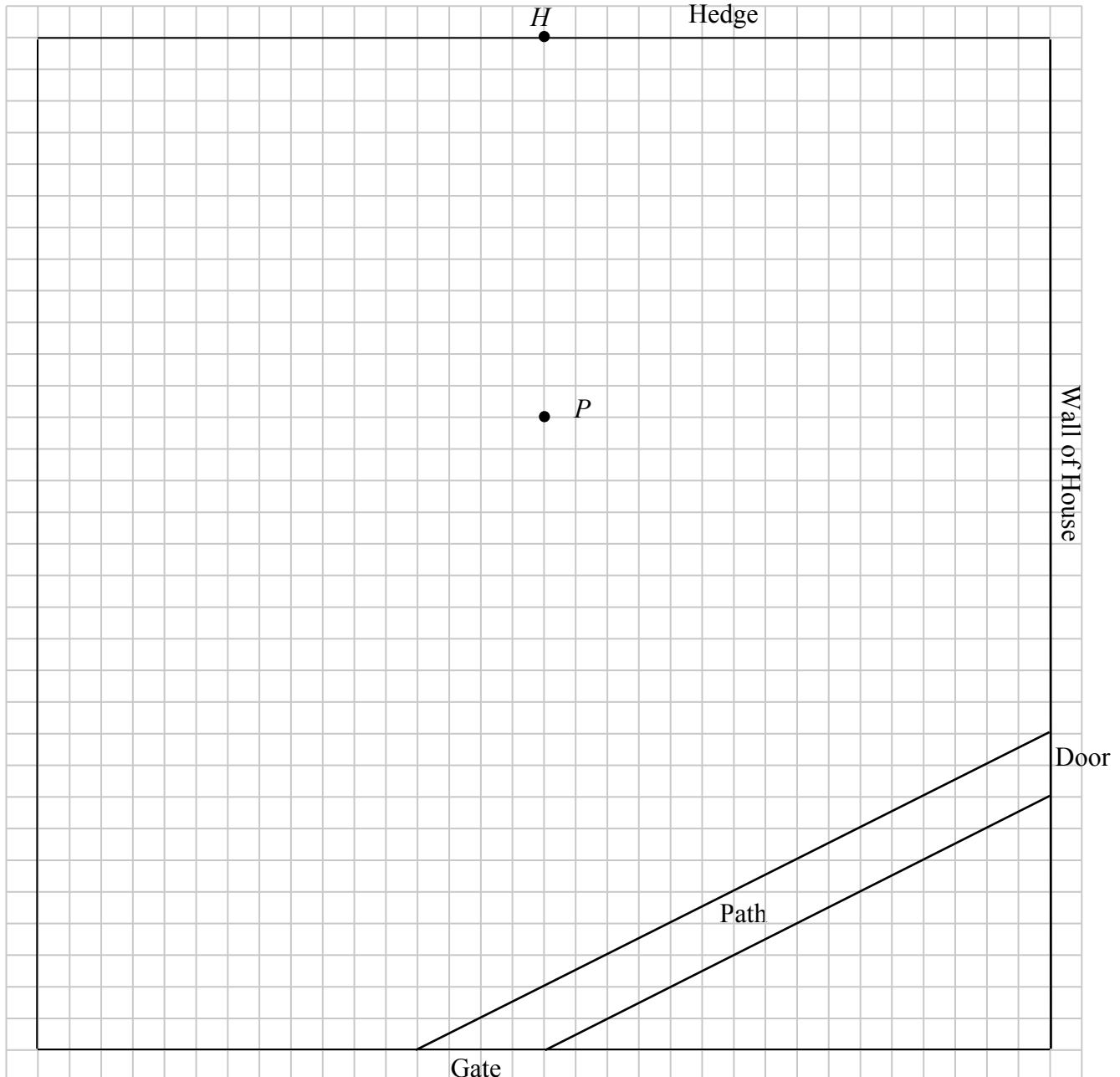
$$A = \underline{\hspace{2cm}} \quad B = \underline{\hspace{2cm}} \quad C = \underline{\hspace{2cm}}$$

|      |         |
|------|---------|
| page | running |
|------|---------|

**Question 8****(25 marks)**

Below is a scale diagram of the front garden of a house. The length of each square in the grid represents 0·5 m. The length of each side of the garden is 16 m.  $P$  shows the location of a post which is 6 metres from the hedge at  $H$ . A dog is tied to the post by a leash which is 7 m long.

- (a) (i) Use your compass to construct all the points in the garden which are 7 m from  $P$



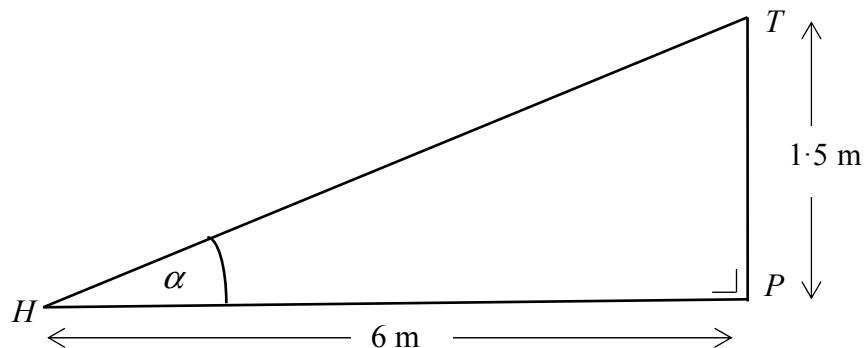
- (ii) A delivery man is worried about the dog but the house owner assures him that the dog cannot reach the path. Is the house owner correct? Give a reason for your answer.

Answer:

Reason:

|  |
|--|
|  |
|--|

- (b) The diagram below shows the vertical post  $[PT]$  and the point  $H$  which is on the ground. The measurements are as shown. (Diagram not drawn to scale.)



Find  $|\angle \alpha|$ , correct to the nearest degree.

**Section B****100 marks**

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

**Question 9****(50 marks)**

Chris needed to repair the pump in his well. He telephoned two companies and asked them about their fees. The first company, *Well Well Ltd.*, said they have a callout fee of €50 and a fee of €30 per hour after that. The second company, *Well Mended Ltd.*, said they don't have a callout fee, just a fee of €40 per hour. Both companies estimated that the work could take up to 8 hours.

- (a) Complete the tables below showing the fees for each company.

| <i>Well Well Ltd.</i> |                |
|-----------------------|----------------|
| <b>Time (Hours)</b>   | <b>Fee (€)</b> |
| 0                     | 50             |
| 1                     | 80             |
| 2                     |                |
| 3                     |                |
| 4                     |                |
| 5                     |                |
| 6                     |                |
| 7                     |                |
| 8                     |                |

| <i>Well Mended Ltd.</i> |                |
|-------------------------|----------------|
| <b>Time (Hours)</b>     | <b>Fee (€)</b> |
| 0                       | 0              |
| 1                       | 40             |
| 2                       |                |
| 3                       |                |
| 4                       |                |
| 5                       |                |
| 6                       |                |
| 7                       |                |
| 8                       |                |

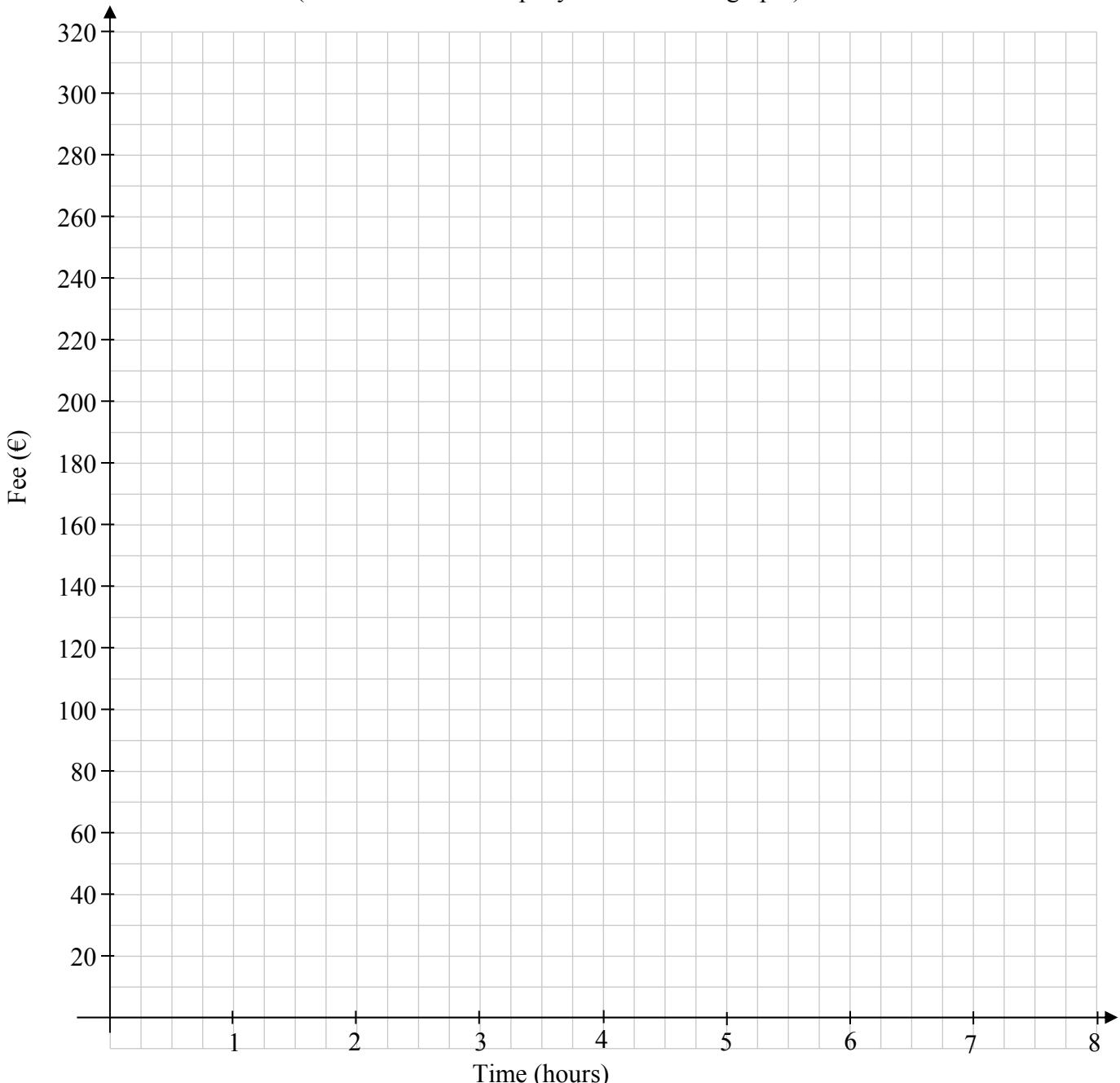
- (b) The job took 7 hours. Which company would have charged Chris the least amount of money?

Answer: \_\_\_\_\_

- (c) Write down a formula to represent the fee to be paid to *Well Well Ltd.* for any given number of hours work. State clearly the meaning of any letters used in your formula.



- (d) On the axes below, draw the graphs of the fees that each of the two companies charge, over the first 8 hours. (Put the relevant company name on each graph.)



- (e) What are the co-ordinates of the point of intersection of your two graphs? Explain what each of the two numbers mean in the context of the question.

Point:

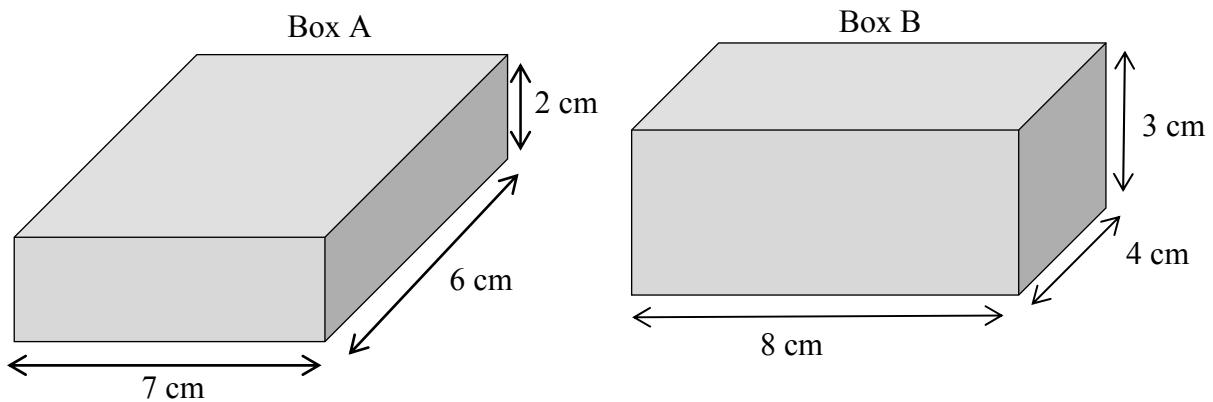
Explanation:

|      |         |
|------|---------|
| page | running |
|------|---------|

## Question 10

**(50 marks)**

Geraldine's company, TLC Ltd., makes rectangular cardboard boxes with lids. Two of the company's boxes, Box A and Box B, with their dimensions given, are shown below. Geraldine has been told that both boxes have the same surface area.

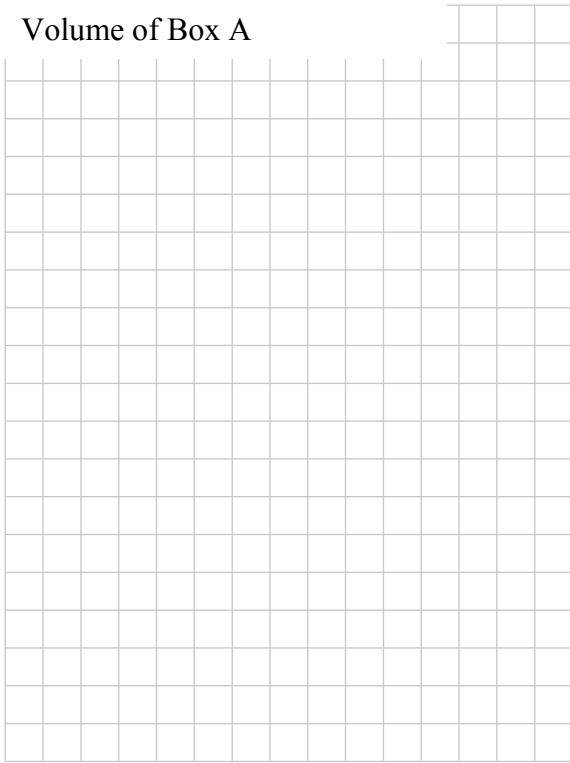


- (a) (i)** Show that both boxes have the same surface area.

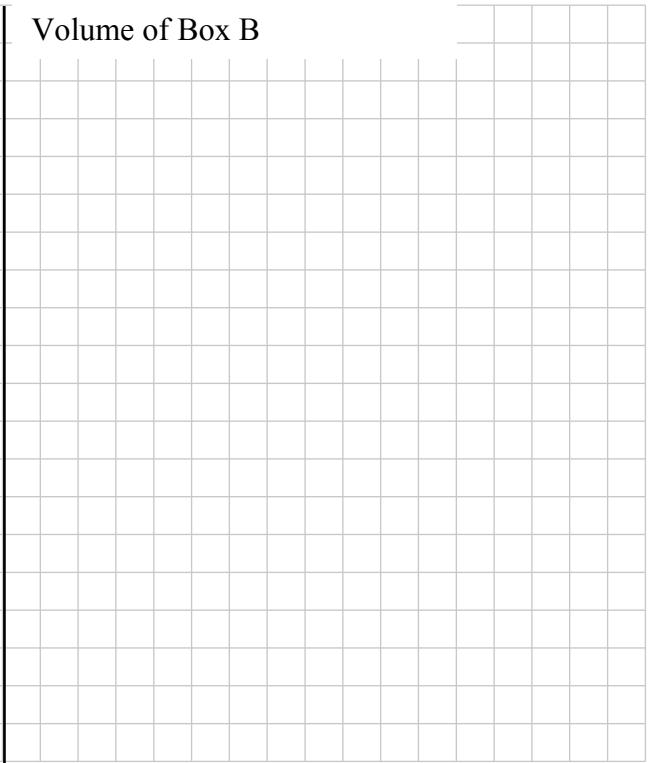
## Surface area of Box B

- (ii) Geraldine wants to use the box with the greater volume. Find which box has the greater volume.

Volume of Box A

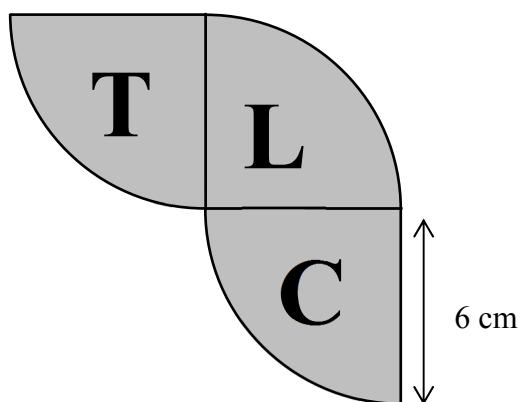


Volume of Box B

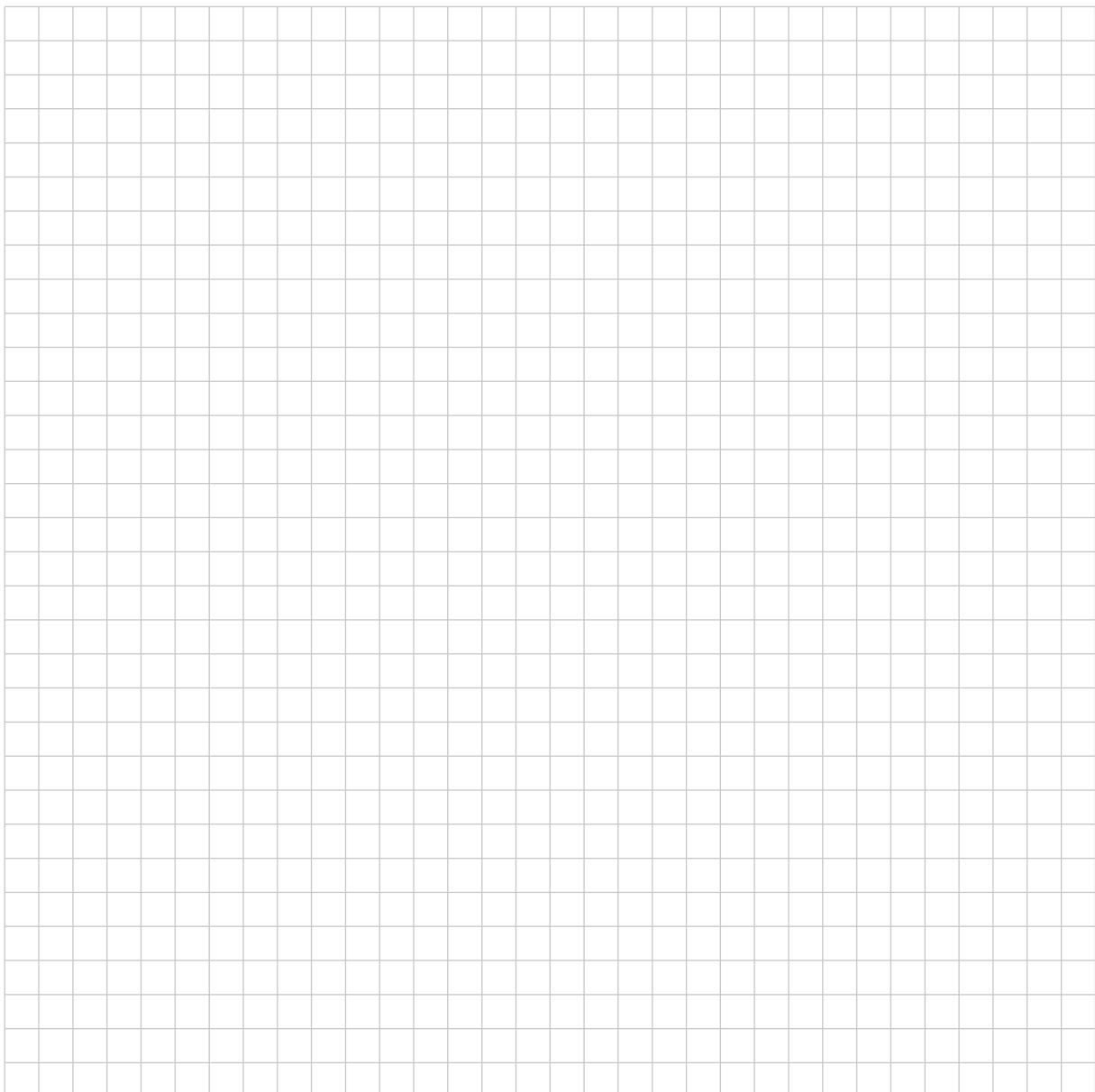


Answer: \_\_\_\_\_

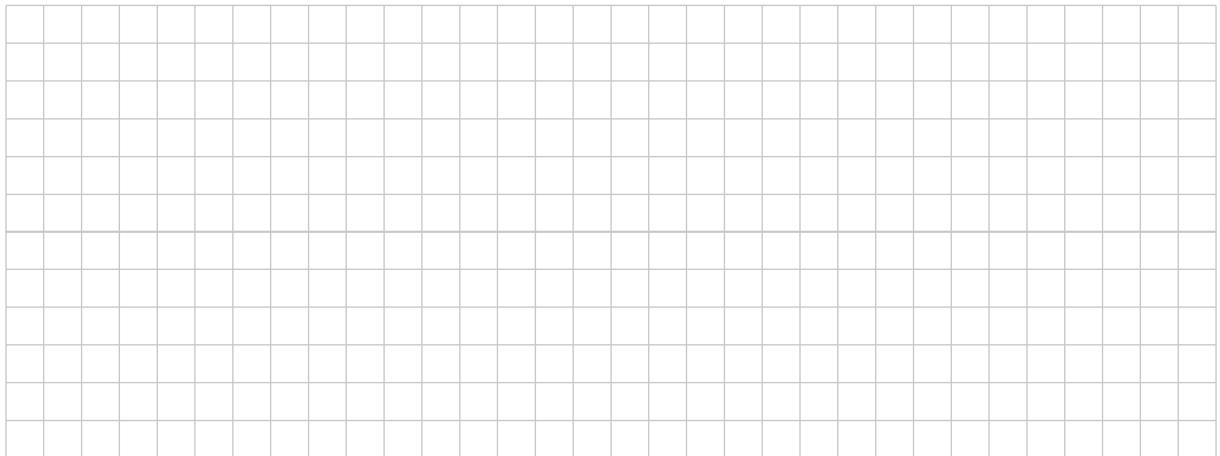
- (b)** The diagram below shows the logo for Geraldine's company, TLC Ltd. Each letter is contained in a quarter circle of radius 6 cm.



- (i)** Construct the full sized logo in the grid below. (You do not need to include the letters.)



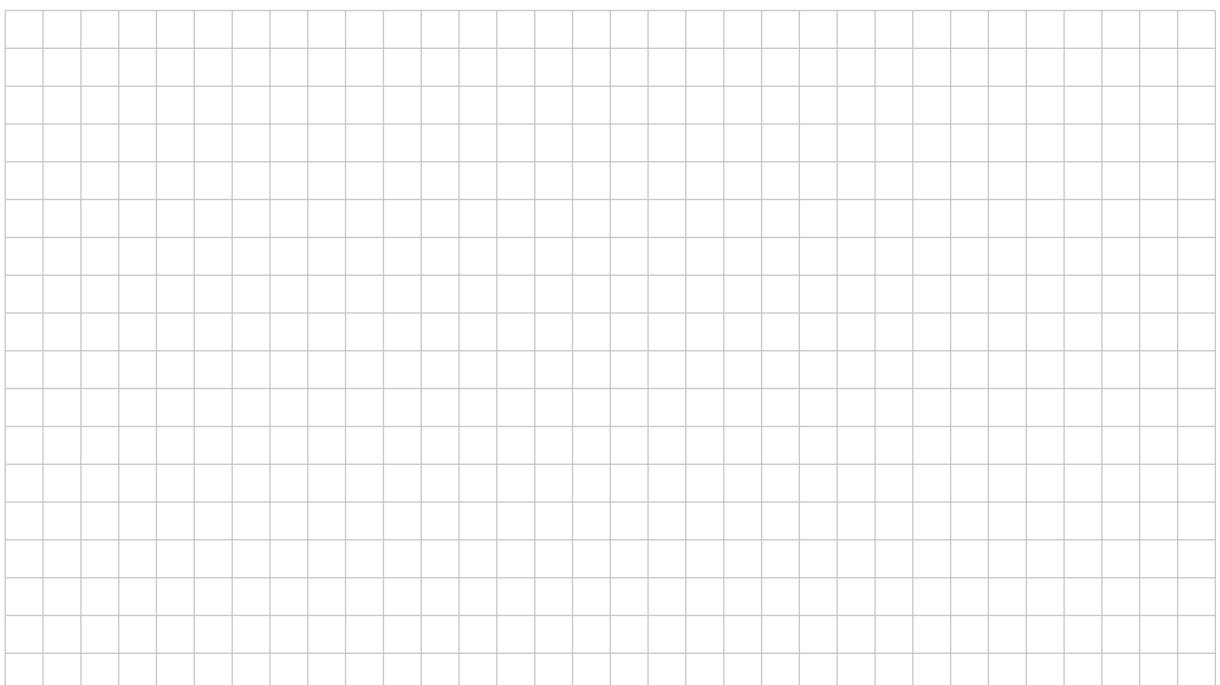
- (ii) Find the length of the perimeter of this logo. Give your answer correct to the nearest whole number.



- (iii) Find the area of the logo. Give your answer correct to three decimal places.

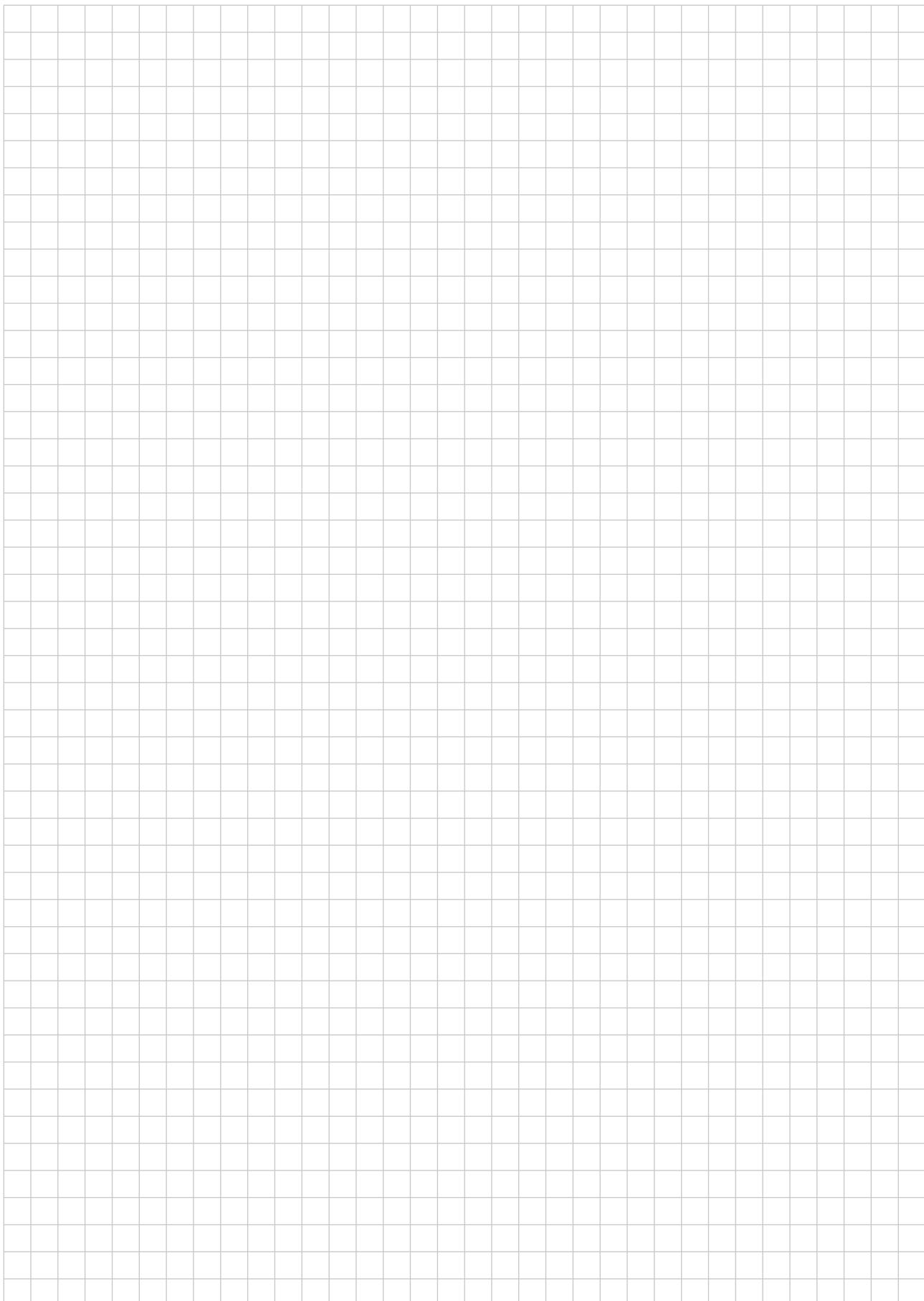


- (iv) The material used to construct the logo costs €0.25 per  $\text{cm}^2$ . Find the cost of constructing 50 logos, correct to the nearest euro.

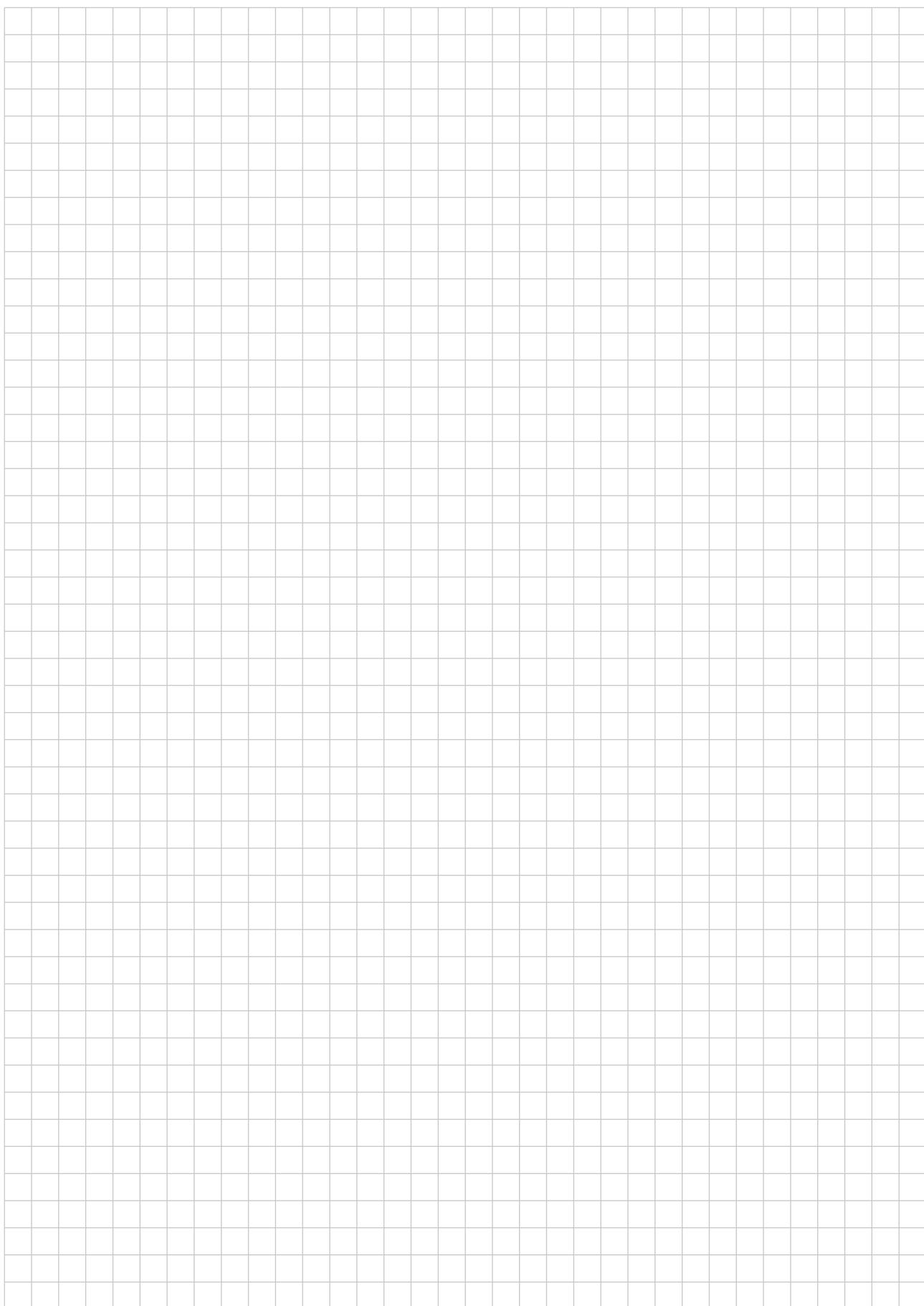


|      |         |
|------|---------|
| page | running |
|------|---------|

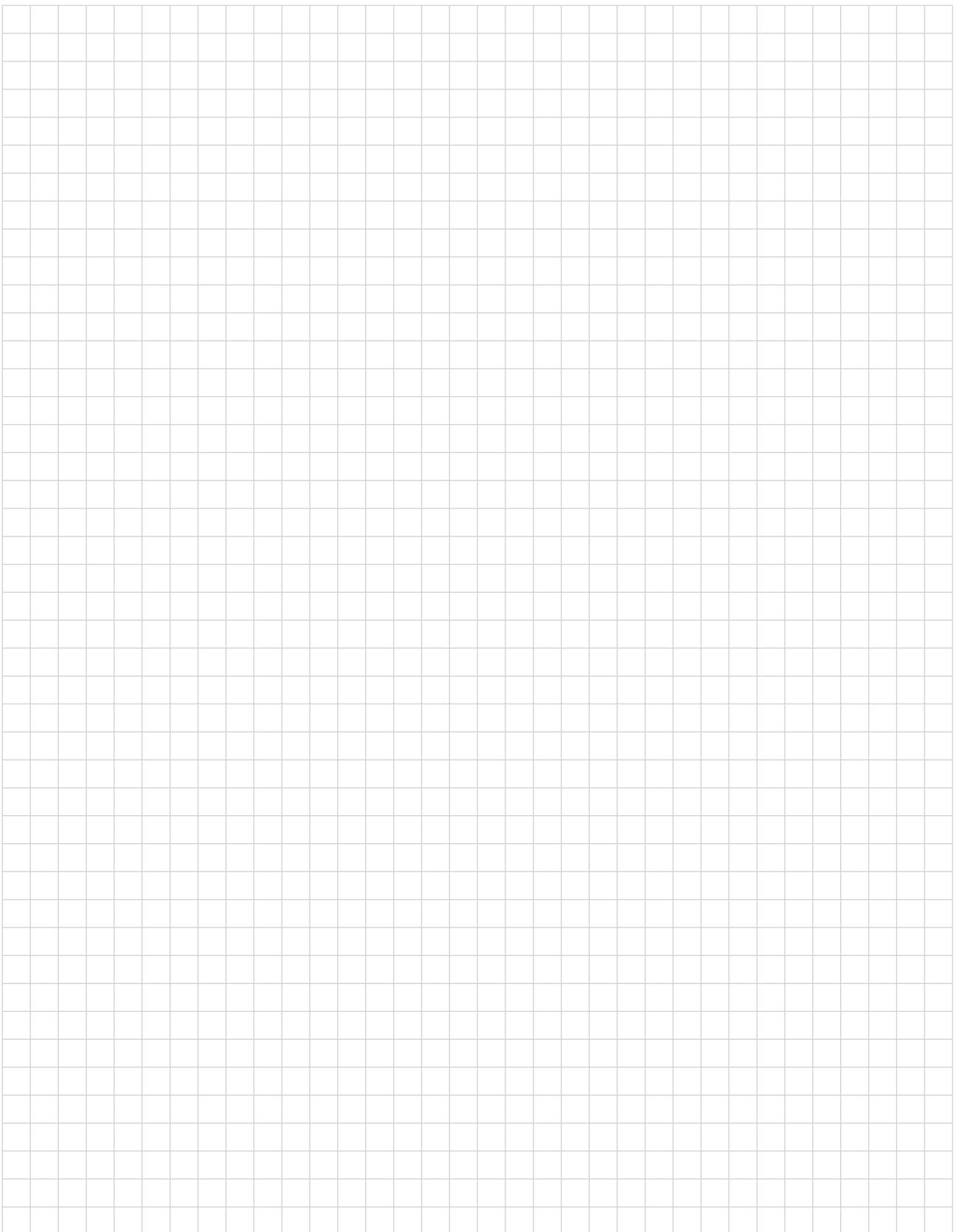
You may use this page for extra work.



You may use this page for extra work.



|      |         |
|------|---------|
| page | running |
|------|---------|



Leaving Certificate 2015 – Foundation Level

## **Mathematics**

Friday 5 June

Afternoon 2:00 – 4:30