Name ➢	
School ➢	
Teacher ➢	

Pre-Leaving Certificate Examination

Mathematics

Foundation Level

Time: 2 hours, 30 minutes

300 marks

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

Centre Stamp

Running Total

Grade

Instructions

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

Section A	Concepts and Skills	200 marks	8 questions
Section B	Contexts and Applications	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.

Answers should include the appropriate units of measurement, where relevant.

Answers should be given in simplest form, where relevant.

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

Section A	Concepts and Skills	200 marks

Answer **all eight** questions from this section

Question 1 **(25 marks)**

(a) Use your calculator to answer the following.

(i) Write $0.\dot{2}\dot{3}$ as a fraction

(ii) Find 12.47% of $€25{,}000$, correct to the nearest euro.

(iii) Evaluate $\frac{3\pi}{\sqrt{7}} \times \cos 87°$, correct to 2 decimal places.

Googol

10, 000, 000, 000

Question 2 **(25 marks)**

(a) A newspaper states: 'It will most probably rain tomorrow.'

Which of the following best represents the probability of an event that will most probably occur? Circle the most appropriate answer and explain your answer.

33 % 50% 80% 100%

(b) Some men and women were surveyed at a football game. They were asked which team they supported. The results are shown in the two-way table.

	Team A	***Team B***	***Total***
Men	125	100	225
Women			165
Total	200		

(i) Complete the table above

(ii) What percentage of women surveyed supported Team B, correct to the nearest percent?

(iii) What fraction of people, in its simplest form, support Team A?

Question 3 **(25 marks)**

(a) A personal identification number (PIN) is made up of four digits. An example of a PIN is

0	2	2	9

(i) When all ten digits are available for use, how many different PINs are possible?

(ii) What is the probability that one such PIN number is 1234 in that order?

(b) The diagram below shows a stem-and-leaf plot for 22 scores.

2	3	5	9		
3	1	4	7	9	
4	2	2	2	5	7
5	1	2	4		
6	2	3	7		
7	5	8	8	8	

(i) What is the mode for this data?

(ii) What is the median for this data?

Question 4 **(25 marks)**

(a) For each of the following sequences of numbers, use the pattern to continue the sequence for two more terms:

(i) 7, 35, 175, 875, _____, _____.

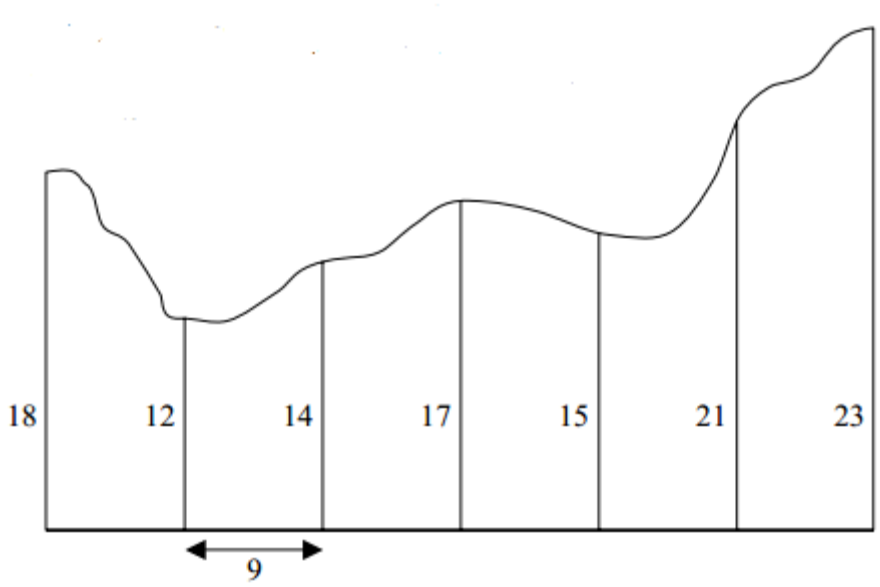
(ii) 100, 92, 84, 76, _____, _____.

(a) (i) Write 256 as 4^n, where $n \in \mathbb{N}$.

(ii) Find $81^{\frac{1}{2}}$.

Question 4 **(25 marks)**

(a) A garden has one irregular side. Offsets of lengths 18, 12, 14, 17, 15, 21, and 23 metres are measured from the irregular side to the opposite side, as shown. The offsets are 9 metres apart.



(i) Calculate the area of the garden using the Trapezoidal Rule.

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(b) Solve the quadratic equation $2x^2 + 5x - 1 = 0$.

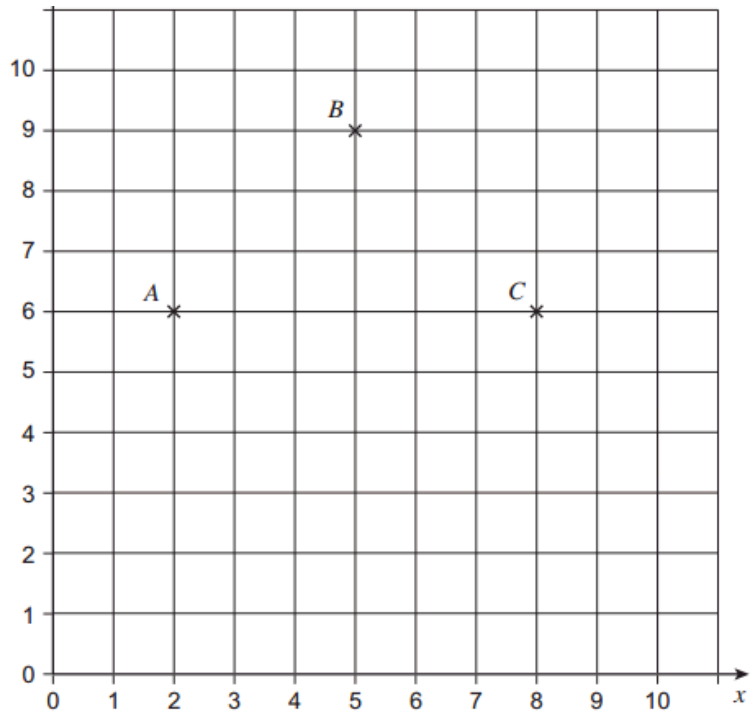
Give your answers correct to two decimal places.

(c) €3500 is invested for four years at a fixed rate of compound interest. During the first year it earns €140.

What is the annual rate of interest?

Question 5 **(25 marks)**

(a) Here is a centimetre–square grid with points A, B and C plotted.



(i) Write down the coordinates of point A.

A = (,)

(ii) Plot the point D so that ABCD is a square.

(iii) Write down the coordinates of point D

D = (,)

(iv) Use a ruler to measure all four sides of your square. Write down the length of the sides.

(v) If each cm of your ruler represents a distance of 10 km on a map, find the total area of the square on the map.

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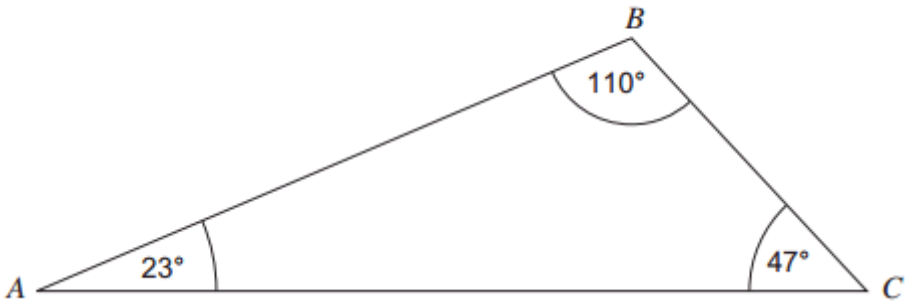
Question 6 **(25 marks)**

The diagram shows a triangle ABC.



(a) (i) Circle the correct word to describe triangle ABC.

Scalene Isosceles Equilateral

(ii) Explain why you chose this word.

(b) (i) From the diagram above, write down $\angle ABC$ $\angle ABC =$

(ii) Circle the correct word to describe angle $\angle ABC$

Acute Obtuse Reflex

(iii) Explain your answer.

Question 7 **(25 marks)**

(a) A car which costs €16 900 will depreciate at the rate of 15% per year. How much will it be worth at the end of four years? Give your answer correct to the nearest €.

(b) (i) Solve the simultaneous equations

$$3x - 4y = 18$$

$$x + 2y = -4$$

(ii) Find the value of $8t^3 + 3t - 12$ when $t = 2$.

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Question 7 **(25 marks)**

(a) Simplify $4(2y - 7) - 3(2y - 6)$

(b) Write down expressions for the following sentences, by letting *x* represent the unknown number in each case:

(i) *Five times a certain number*

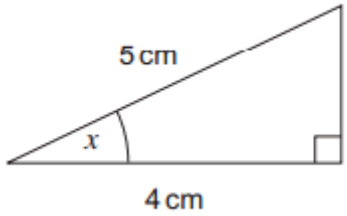
(ii) *Five times a certain number added to 12*

(c) Use your answers to part (b) to write an equation in *x* of the following information and solve it to find the unknown number.

Five times a certain number added to 12 is the same as three times the same number added to 20.

Question 8 **(25 marks)**

(a) The diagram shows a right-angled triangle.



(i) Calculate the value of the unknown side using the Theorem of Pythagoras

(ii) Write down the value of sin x as a fraction

(iii) Use this answer to find the angle x in the diagram above.

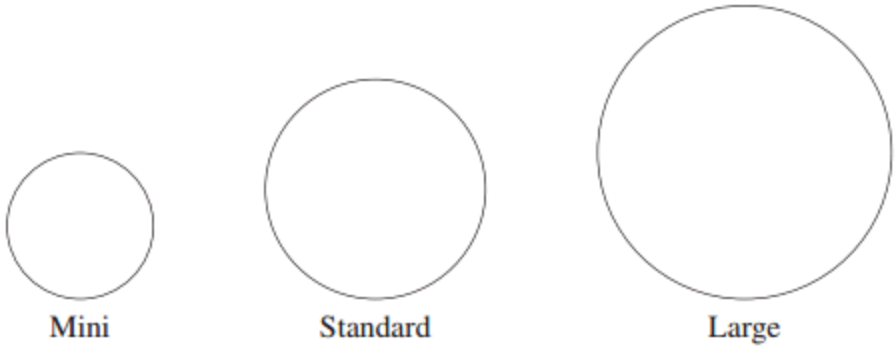
(b) Brian knows that $\sin 30°$ is $\frac{1}{2}$. He thinks that $\sin 60°$ should be 1. Show that Brian is incorrect.

Section B	Contexts and Applications	150 marks

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

Question 9 **(50 marks)**

(a) Joe's pizzas are made in three different sizes.



Joe puts olives on all his pizzas. The number of olives depends on the size of the pizza, as shown in the table.

Size	*Diameter, d,* (cm)	*Number of olives, n*
Mini	20	8
Standard	30	18
Large	40	32

The relationship between the diameter of the pizza and the number of olives can be expressed by the formula:

$$n = kd^2, \qquad \text{where k is a constant.}$$

(i) Use a pair of values from the table to show that $k = 0.02$.

(ii) Joe decides to make a mega-pizza, with diameter 52 cm.

Use the formula to find the number of olives needed for a mega-pizza.

(b) Joe is asked to make a pizza in the shape of a square with sides of length 25 cm. He decides to use the same number of olives as would be needed on a round pizza with the same area.

How many olives will be needed?

(b) Joe uses a microwave oven to heat lasagne. The time taken for heating is inversely proportional to the power setting (in watts). It takes ten minutes at a power setting of 240 watts to heat the lasagne.

How long would it take at a power setting of 500 watts?

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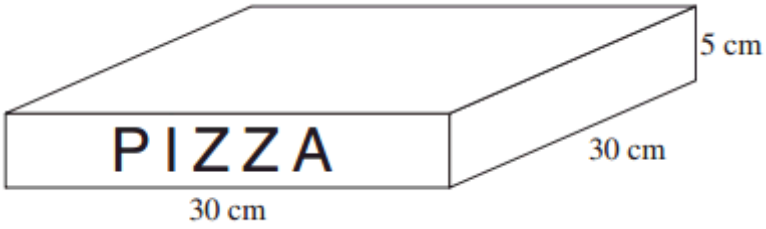
(c) Joe's standard pizza boxes have dimensions as shown.



(i) What is the surface area of one box?

(ii) Draw a picture to show the box needed for the new mega-pizza, similar to the one shown above in part (i). Put all the dimensions into your diagram.

(iii) What is the volume of this new box?

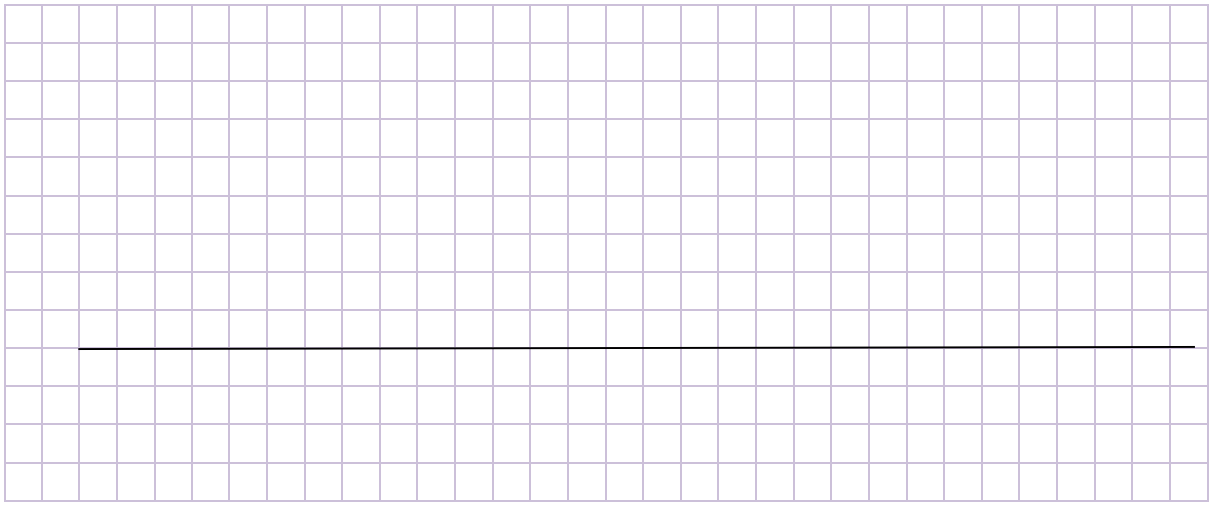
Question 10 **(50 marks)**

A firework is fired upwards from the top of a building. The height, *h* metres, reached by the firework after *t* seconds, is given by $h = 5 + 4t - t^2$.

(i) By using your calculator, or otherwise, complete the table below.

t, seconds	0	1	2	3	4	5	6
h, metres							

(ii) Hence, or otherwise, graph the function of $h = 5 + 4t - t^2$, in the domain $0 \leq t \leq 6$.



(b) Use your graph to find

(i) the height of the building

(ii) the maximum height reached by the firework

(iii) the number of seconds taken for the firework to reach a height of 8 metres above the base of the building for the first time

(iv) how high the firework is after 4.5 seconds

(c) Eoin thinks that there is something wrong with the firework by looking at the graph. Do you agree with Eoin? Explain your answer fully.

You may use this page for extra work.

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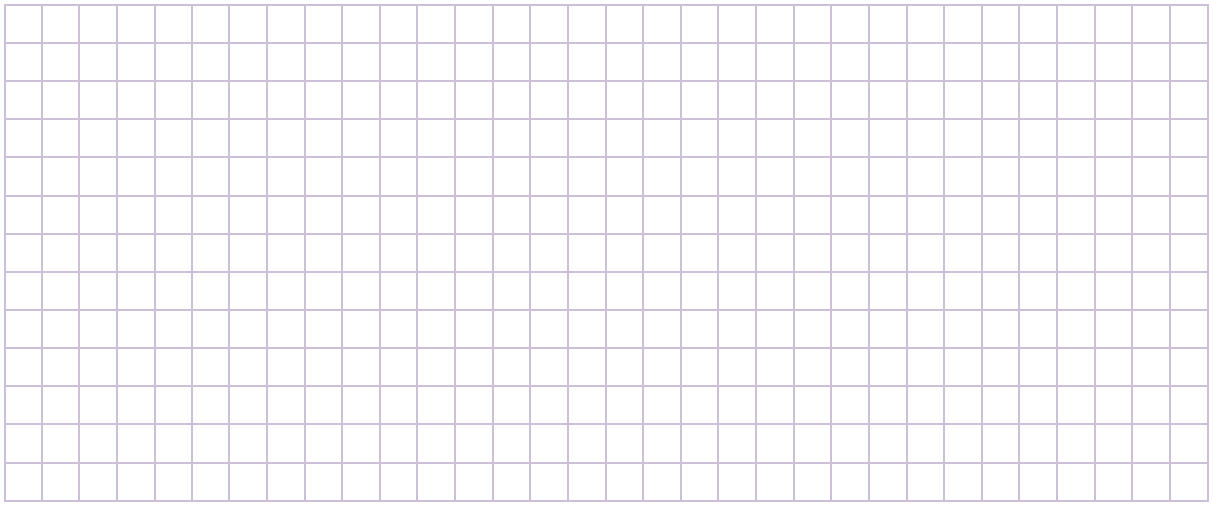
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