



Coimisiún na Scrúduithe Stáit  
State Examinations Commission

Leaving Certificate Examination 2021

# Mathematics

Foundation Level

Friday 11 June Afternoon 2:00 – 4:30

230 marks

<i>For the Candidate only</i>					
Examination number					

<i>For the superintendent only</i>	
Centre Stamp	

<i>For the Examiner only</i>				
		Sec.	Question	Mark
<i>Disallowed</i>		A	1	
1st A			2	
2nd A			3	
1st B			4	
2nd B			5	
Total Disall.			6	
			7	
		8		
<i>Cumulative Check</i>		B	9	
Running Total			10	
– Total Disall.			11	
= Total			↔	Total

Grade

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## Instructions

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

Section A	180 marks	8 questions
Section B	50 marks	3 questions

Answer questions as follows:

- any six questions from Section A
- any one question from Section B

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.

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.

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:



- (b) Two students in a maths class did a project to test the battery life of 2 different battery brands, Brand A and Brand B. They recorded how long 11 of each brand of battery lasted. The results are shown in the stem-and-leaf diagrams below.

**Brand A**

**Hours**

3		0 7
4		1 3 3 5
5		2 4 7
6		0 1

**Brand B**

**Hours**

3		4 5
4		1 4 5 8 8
5		0 6 9
6		2

Key: 4 | 5 = 45 hours

- (i) What is the median battery life of each type?

<p><b>Brand A</b> Median =</p>	<p><b>Brand B</b> Median =</p>
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- (ii) What is the range of each type?

<p><b>Brand A</b> Range =</p>	<p><b>Brand B</b> Range =</p>
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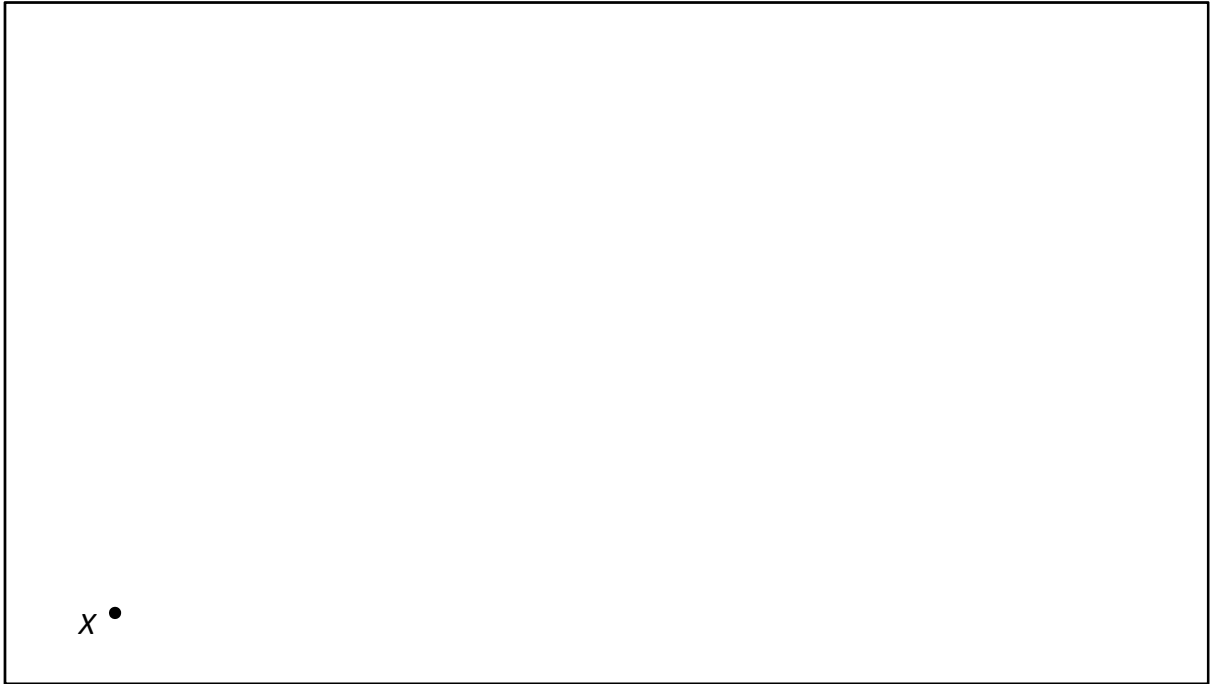
- (iii) Based on the students' tests, which brand do you think is longer lasting? Give a reason for your answer.

<p>Answer:</p>	
<p>Reason:</p>	

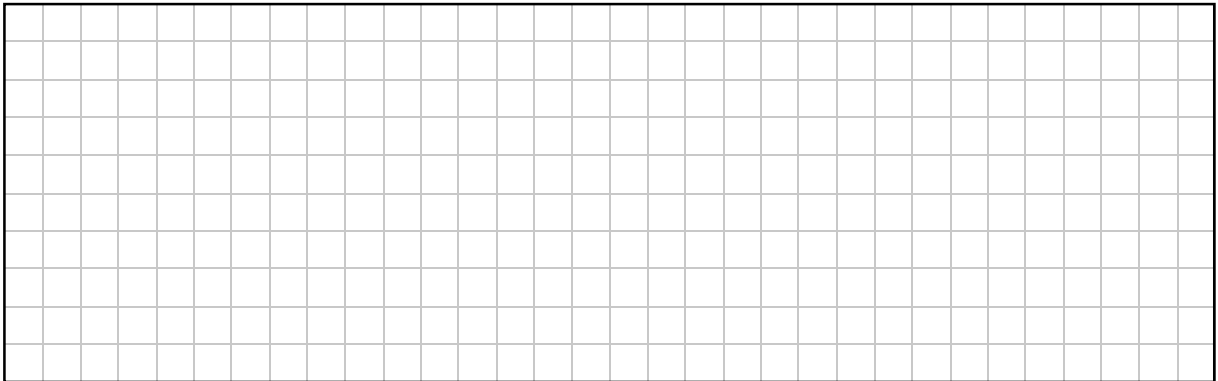
**Question 2**

**(30 marks)**

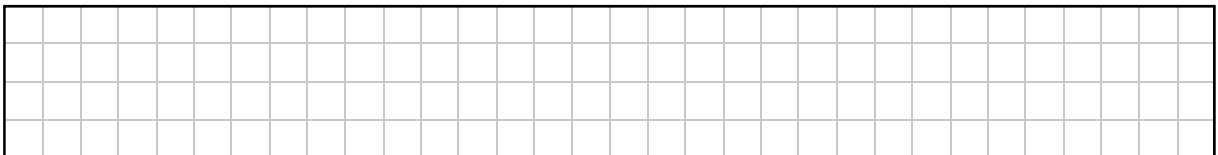
- (a) Construct the triangle  $XYZ$  where  $|XY| = 8.5$  cm,  $|\angle XYZ| = 90^\circ$  and  $|YZ| = 5.3$  cm. The point  $X$  is marked in for you in the space below.



- (b) Use Pythagoras' Theorem to find the length of  $[XZ]$ . Give your answer correct to the nearest cm.



- (c)  $X$ ,  $Y$ , and  $Z$  represent the position of 3 towns on a map. The scale on the map is 1 cm = 5 km. Find the distance between Town  $X$  and Town  $Y$ .





**Question 3**

**(30 marks)**

**(a)** Put the following numbers in order, starting with the lowest:

$$40\%, \frac{5}{12}, 0.45, \frac{3}{8}$$

**(b)** Viggo is 9 years old and his sister Wren is 6 years old.  
€75 is divided between them in the ratio of their ages.  
How much money does Viggo get?









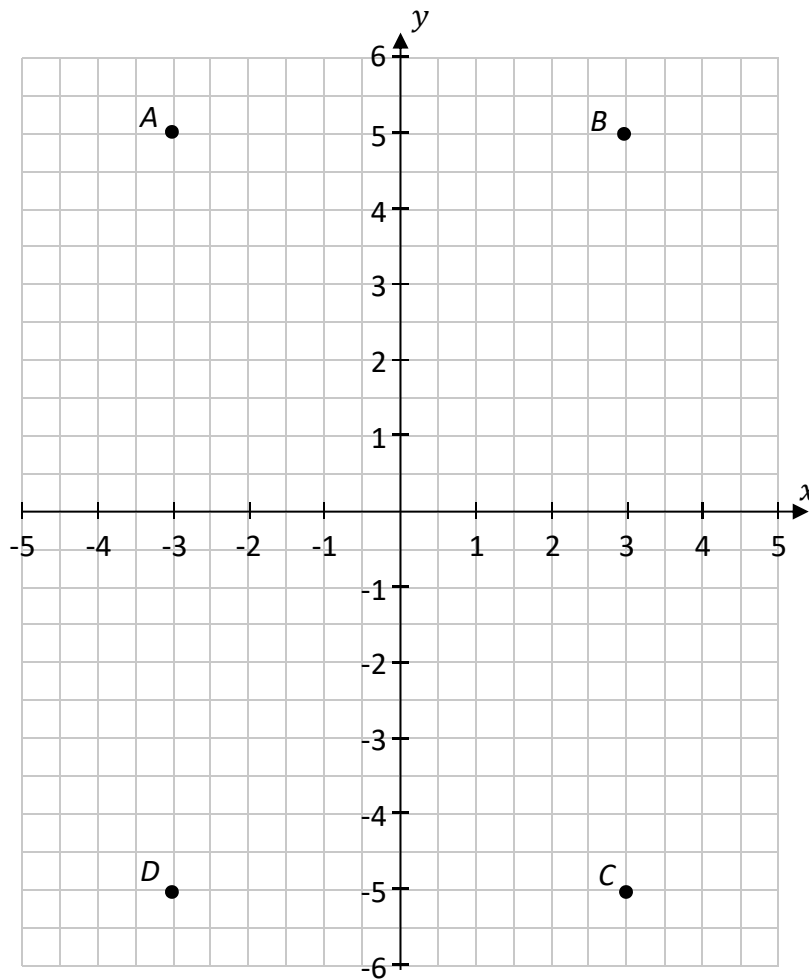




**Question 6**

**(30 marks)**

(a)  $A(-3, 5)$ ,  $B(3, 5)$ ,  $C(3, -5)$ , and  $D(-3, -5)$  are 4 points, as shown on the grid below.



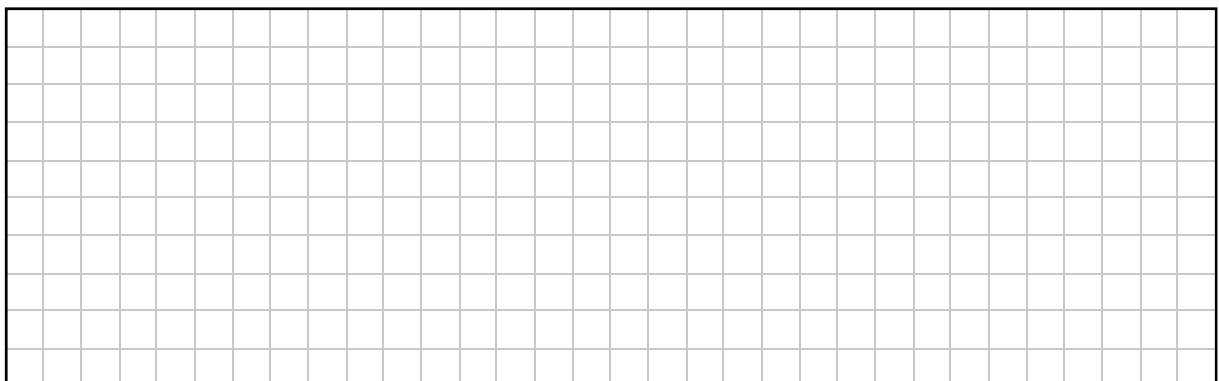
Answer the following:

The answer in each case is  $A$ ,  $B$ ,  $C$ , or  $D$ .

(i) The image of  $A$  by the central symmetry in the origin is

(ii) The image of  $C$  by the axial symmetry in the  $y$ -axis is

(b) Find the area of  $\triangle ABC$ , in  $\text{cm}^2$ , given that each small square box is  $0.5 \text{ cm} \times 0.5 \text{ cm}$ .





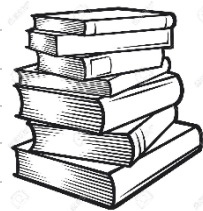
**Question 7**

**(30 marks)**

- (a) Eilínóir is choosing subjects to study for her Leaving Certificate. She has three subjects left to choose: one language, one science subject, and one business subject. She has to choose from the table below.

Language	Science	Business
French	Agricultural Science	Accounting
German	Biology	Business
Italian	Chemistry	Economics
Spanish	Physics	

- (i) In how many different ways can Eilínóir choose her three subjects?


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- (ii) Her friend, Noah, also has to choose subjects from the same list. He will **not** choose Italian in the language section. He must choose Agricultural Science **or** Biology from the Science section. In how many different ways can Noah choose his three subjects?

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**(b)** Alex did a test. There were two sections in the test; Section A (80 marks) and Section B (120 marks). He got 55% in Section A and 75% in Section B.

**(i)** How many marks did Alex get in section A of the test?

**(ii)** How many marks did Alex get in total in the test?

**(iii)** What was Alex's overall percentage in the test?



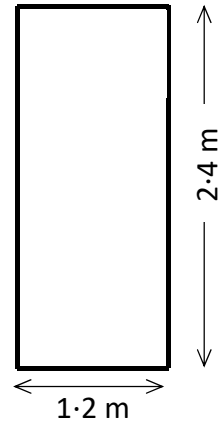


**Question 10**

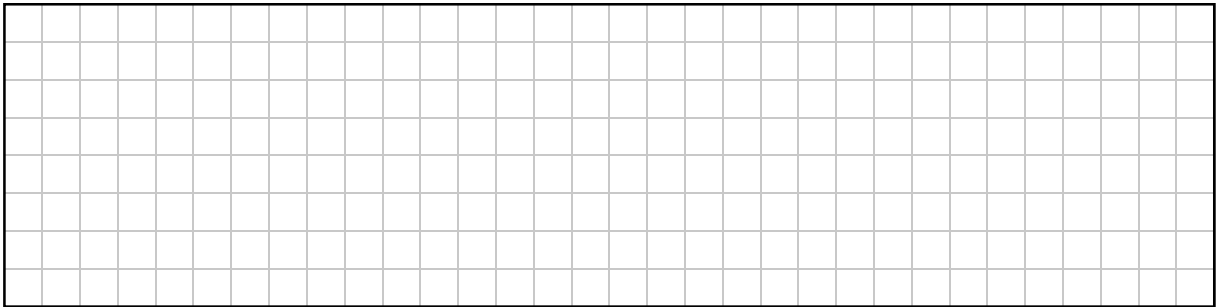
**(50 marks)**

**(a)** Jack must varnish a large solid wooden rectangular door, as shown in the diagram below.

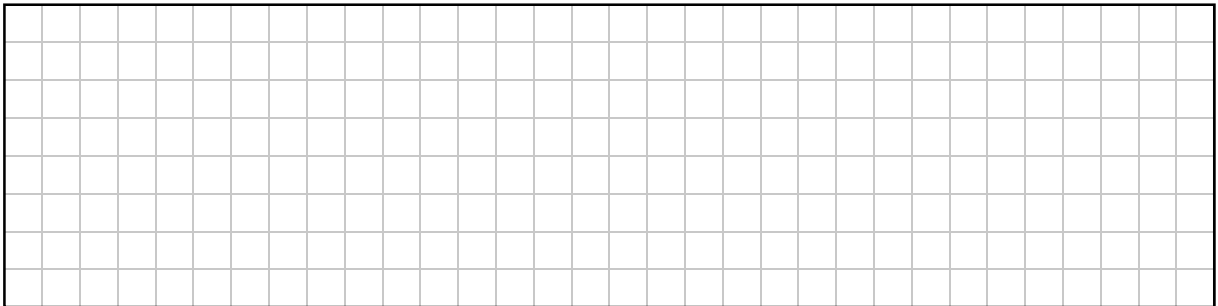
**(i)** Show that the area of the door is  $2.88 \text{ m}^2$ .



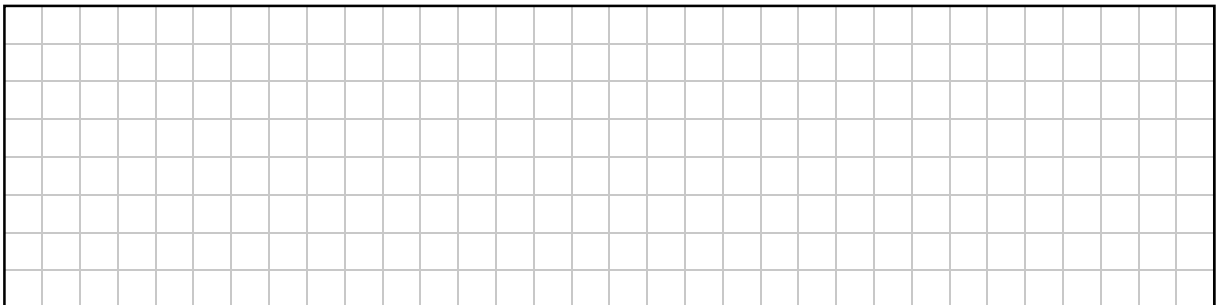
**(ii)** The varnish is to be applied to both sides of the door.  
Each side needs 2 coats of varnish.  
One can of varnish will cover  $4.5 \text{ m}^2$ .  
How many cans of varnish does Jack need to buy?



**(iii)** Each can of varnish costs €14.50. Find how much Jack pays for the varnish.



**(iv)** Jack must also attach a draft excluder around the edge of the door.  
Find, in metres, the perimeter of the door.

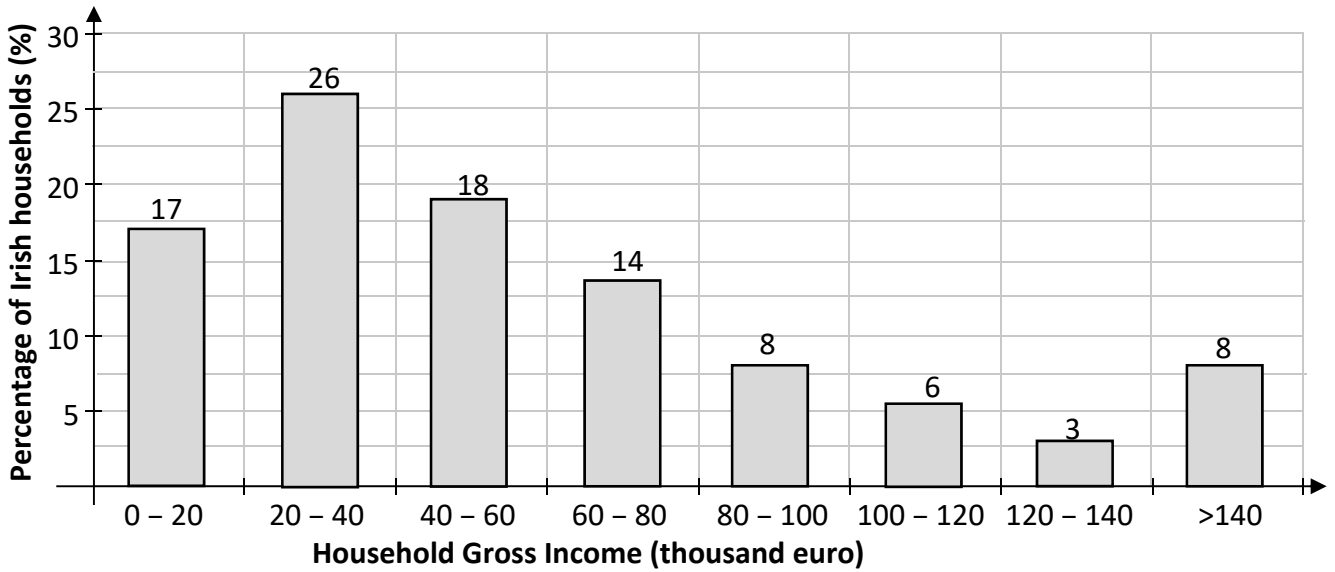




**Question 11**

**(50 marks)**

- (a) The bar chart below shows data on the gross income per household in Ireland in 2016 (CSO).  
Note: 20 – 40 means 20 and over but less than 40.



- (i) What percentage of households had an income less than €60 000?

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- (ii) If a household was chosen at random, what was the probability that the income was €120 000 or greater than €120 000?

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- (iii) In which income group does the median of the data lie?

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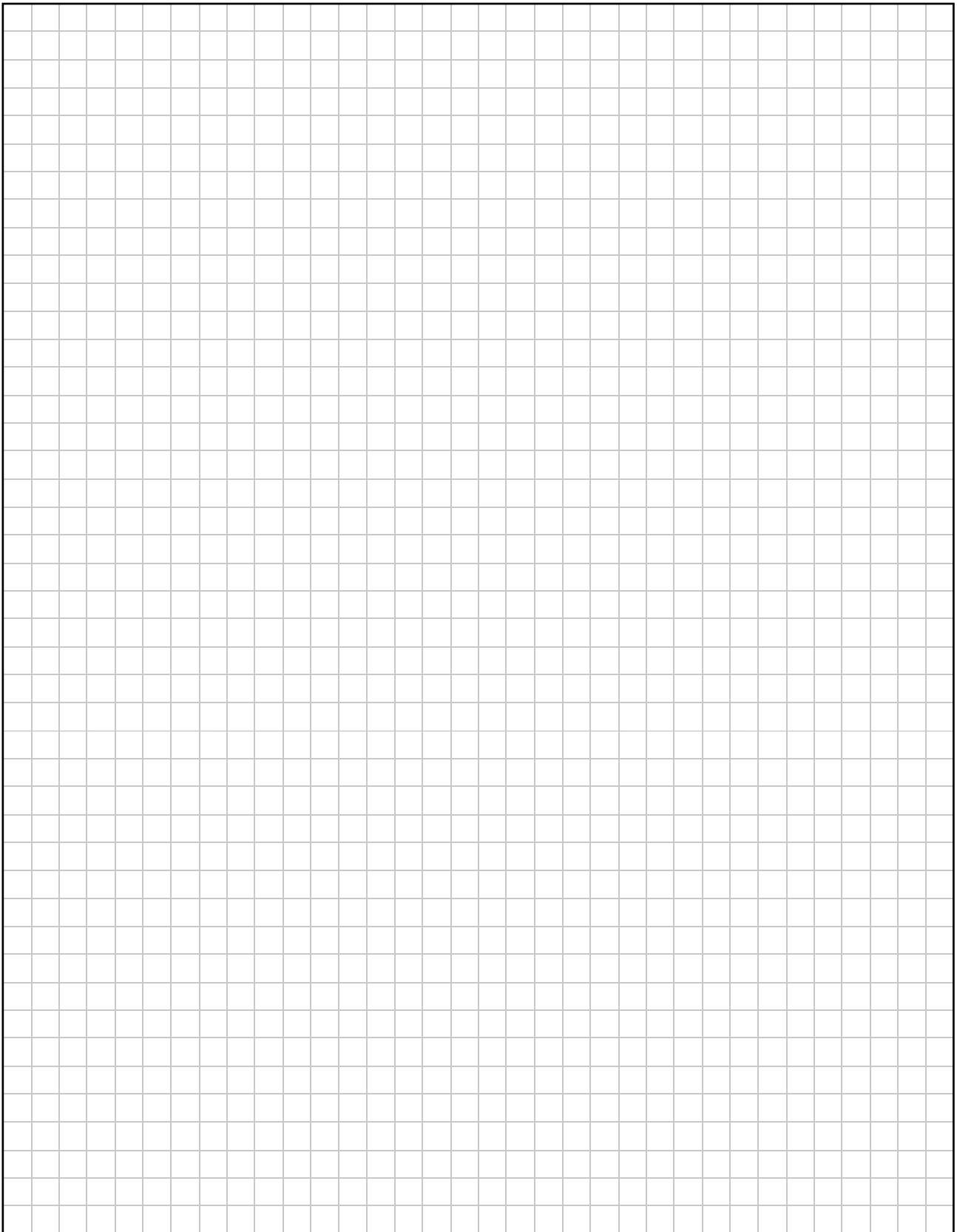
- (c)** Shane and Amanda are a married couple with two children.  
They both work and have a combined gross income of €42 000 per year.  
They pay tax at the standard rate of 20%.  
Their tax credit is €3300.

**(i)** Find the amount of income tax they pay.

**(ii)** Shane and Amanda also pay total PRSI of €1680 and total USC of €1190.  
Find their annual take-home pay after the deductions of income tax, PRSI and USC.

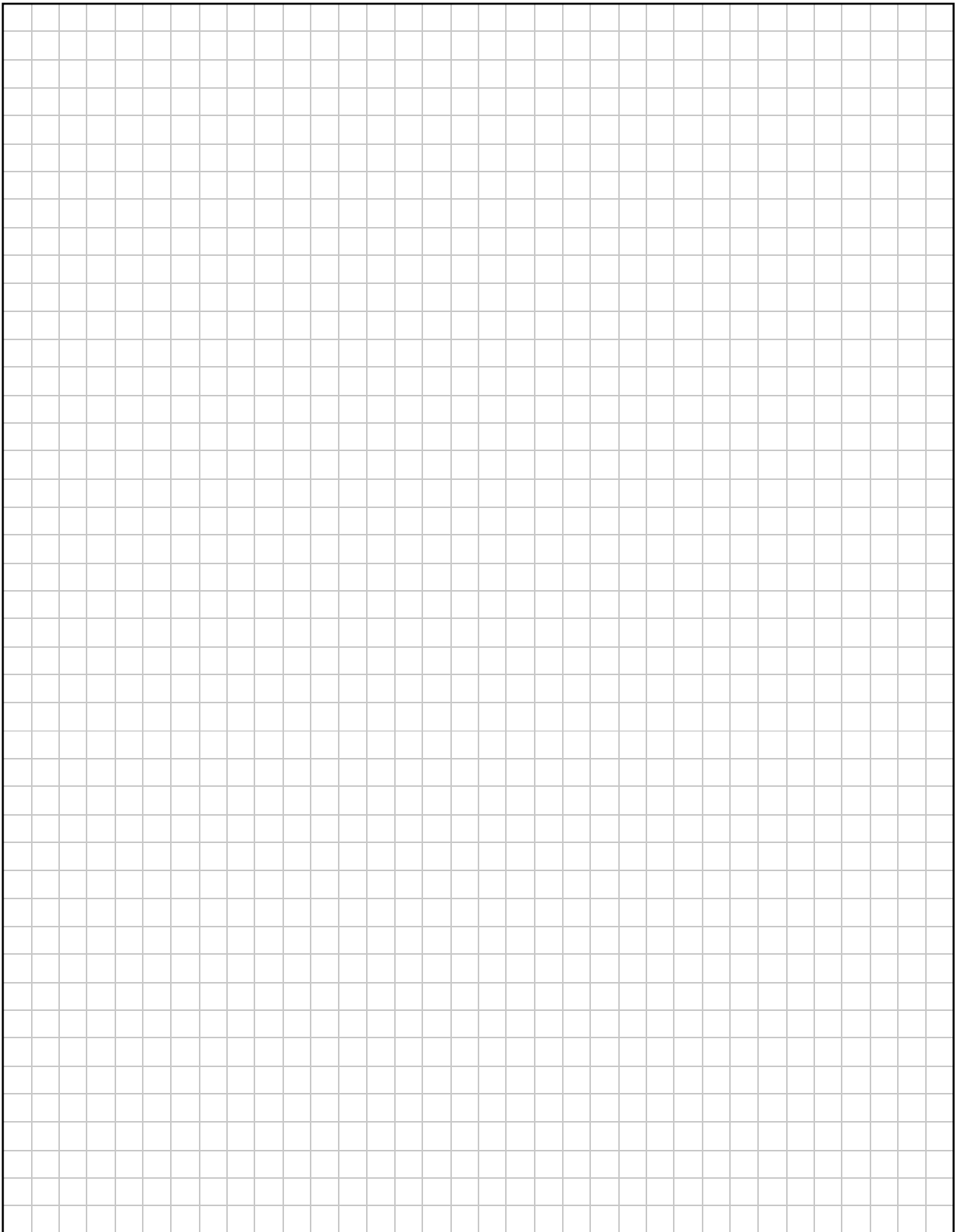
Page for extra work.

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



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**Mathematics**

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