



**Coimisiún na Scrúduithe Stáit
State Examinations Commission**

Leaving Certificate Applied 2017

Mathematical Applications

(200 marks)

Friday 9 June
Morning 9:30 – 11:30

General Directions

1. Write your EXAMINATION NUMBER in this space:
2. Write all answers in the boxes or spaces in this answerbook.
3. Show all necessary work in the space provided.
4. Calculators may be used.
5. Answers involving money should be given correct to the nearest cent, unless otherwise indicated.

ANSWER QUESTION ONE AND THREE OTHER QUESTIONS.

ALL QUESTIONS CARRY EQUAL MARKS.

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

<i>For the examiner only</i>	
Question	Mark
1	
2	
3	
4	
5	
↔	
= Total	

Credit

Question 1

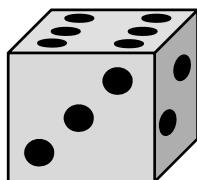
- (a) John lodges three cheques worth €24·67, €23·89, and €123·54. Find the **total amount** he lodges.

A large grid of squares for drawing or writing, with a smaller box labeled "Answer:" on the right.

- (b)** A medicine bottle has a volume of 350 ml. How many single doses of 25 ml are in the bottle?

A large grid of empty squares for drawing or writing, followed by a box labeled "Answer:".

- (c) A regular unbiased die is rolled once. Find the **probability** of rolling a 5.



Answer:

- (d) Find the value of $\sqrt{68}$, correct to two decimal places.

A large grid of squares for drawing or writing, with a smaller box labeled "Answer:" on the right.

- (e) A sports drink has the following two special offers:

Offer A:

6 bottles for €8

Offer B:

10 bottles for €14

Which offer gives better value for money, A or B? Use calculations to justify your answer.

- (f) Find the **volume** of a **cube** with sides of length 4 cm.

Answer:

- (g) Melissa has a gross weekly income of €645.
Each week she pays €65.54 in income tax, €25.80 in PRSI, and €21.88 in USC.
Work out her **net** weekly income.

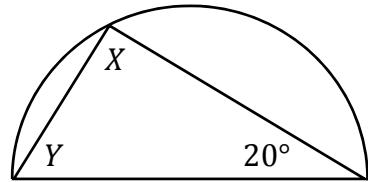
A large grid of squares for drawing or writing, with a smaller box labeled "Answer:" in the bottom right corner.

Answer:

- (h) Work out the number of hours in 3 full weeks.

Answer:

- (i) The diagram on the right shows a triangle and a semi-circle.
One of the sides of the triangle is a diameter of the semi-circle.
Find the size of the angle X and the size of the angle Y .



$$X = \quad Y =$$

X =

$Y =$

- (j) The heights of five students are shown below.

157 cm 183 cm 173 cm 169 cm 168 cm

Work out the **mean (average)** height of the five students, in cm.

Answer:

Answer:

Question 2: Research Element Question on Voting and Elections

The following are the instructions for a ballot paper in a class election:

Write “1” beside the candidate of your first choice.

Write “2” beside the candidate of your second choice, if you have one.

Write “3” beside the candidate of your third choice, if you have one.

All the ballot papers are shown below.

Peter Aoife James	1	Peter Aoife James	2	Peter Aoife James	1	Peter Aoife James	3	Peter Aoife James	2	Peter Aoife James	1	Peter Aoife James	1
Peter Aoife James		Peter Aoife James	1	Peter Aoife James	3	Peter Aoife James	1	Peter Aoife James	2	Peter Aoife James	1	Peter Aoife James	2
Peter Aoife James		Peter Aoife James	2	Peter Aoife James	2	Peter Aoife James	1	Peter Aoife James	1	Peter Aoife James	1	Peter Aoife James	3
Peter Aoife James	1	Peter Aoife James	X	Peter Aoife James	2	Peter Aoife James	3	Peter Aoife James	1	Peter Aoife James	1	Peter Aoife James	2
Peter Aoife James		Peter Aoife James	X	Peter Aoife James	1	Peter Aoife James	2	Peter Aoife James	1	Peter Aoife James	2	Peter Aoife James	3

- (a) Fill in the spaces below to show that the **valid poll** was 14.

Total Poll =

100

Number of Spoiled or Blank Votes =

14

(b) There is only **one** seat to be filled in this election.

Work out the **quota** using the formula below. Show all your work.

$$\text{Quota} = \frac{\text{Valid Poll}}{\text{Number of seats} + 1} + 1$$

Answer:

- (c) Complete the table below to show the **number** and **percentage** of first preference votes that each candidate got. Give each percentage correct to the nearest percent.

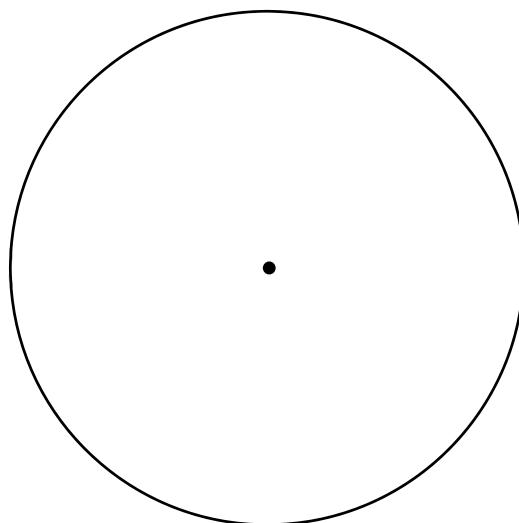
	Peter	Aoife	James
Number of first preference votes			3
Percentage of first preference votes			21%

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- (d) Construct a **pie chart** to show how many first preference votes each candidate got. Label each sector clearly. Show all of your calculations.

Calculations:

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- (e) No candidate reached the quota on the first count, so a second count was needed. James was eliminated with the fewest votes. Complete the table below to show the results of the **second count**.

	First Count	Transferable Votes Received	Second Count
Peter			
Aoife			

- (f) Explain what is meant by a “non-transferable vote”.

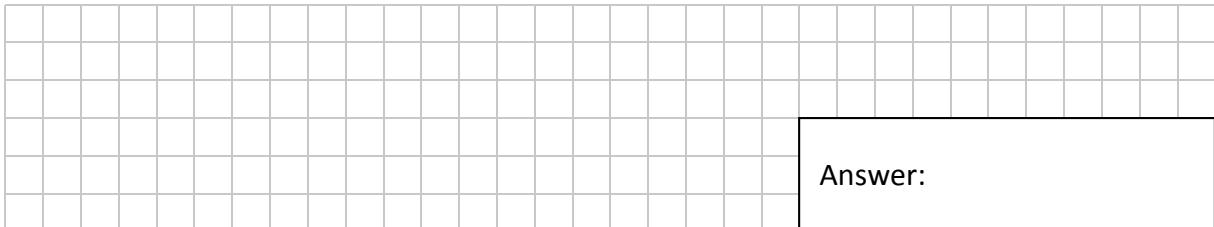
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Question 3

Eibhlín and Máire are building a wall using rectangular bricks.
They lay the bricks in rows of equal length to make the wall.

- (a) The wall will be 5 rows high. They allow a height of 14 cm for each row.

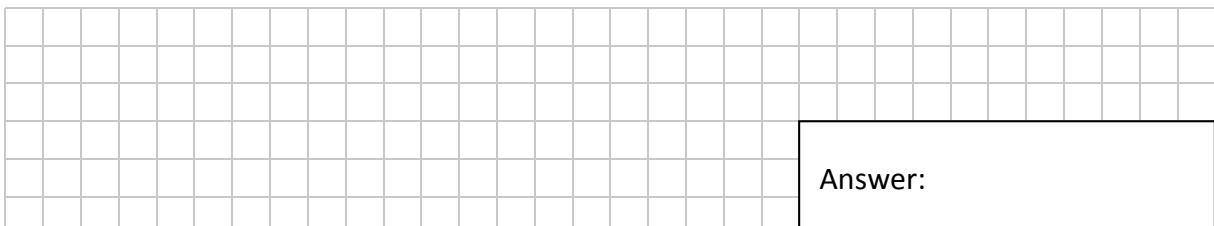
- (i) Find the **total height** of the wall. Give your answer in cm.



Answer:

The wall will be 4·2 m long. They allow a length of 21 cm for each brick.

- (ii) Find the number of bricks they will need in each **row**.



Answer:

- (iii) Find the **total** number of bricks that will be in the wall.



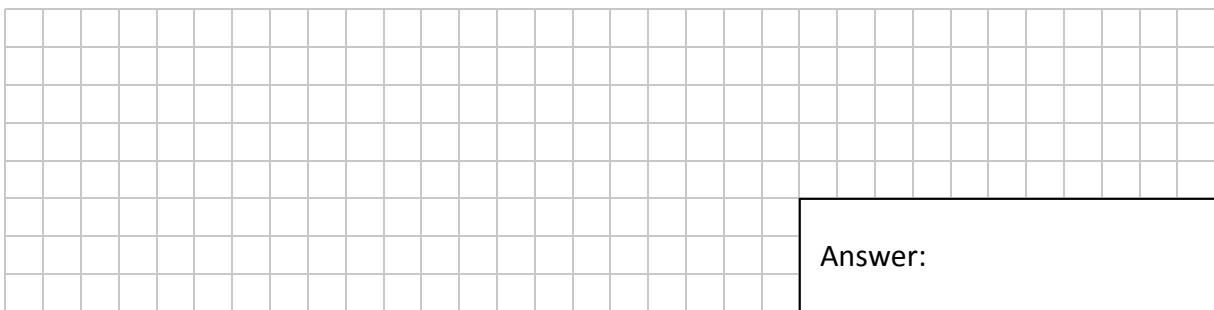
Answer:

- (b) Eibhlín and Máire buy 120 bricks in total, to allow for breakages.

The bricks cost 60 cent each, excluding VAT.

The VAT rate for the bricks is 13·5%.

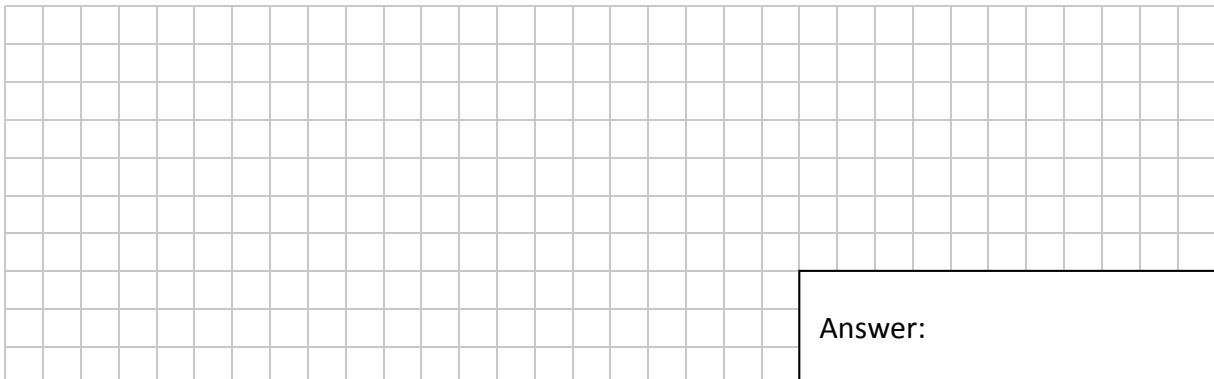
Find the **total cost** of the bricks, including VAT. Give your answer in euro.



Answer:

- (c) Eibhlín and Máire build the wall using red bricks and yellow bricks.
They buy **twice** as many red bricks as yellow bricks.

Find the number of **red** bricks they buy. Remember that they buy 120 bricks in total.



A large rectangular grid consisting of 12 columns and 10 rows of small squares, intended for drawing the wall made of red and yellow bricks.

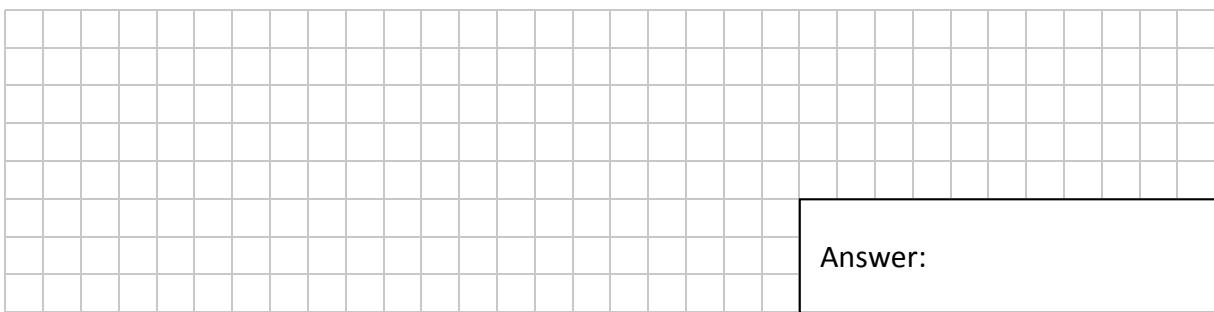
Answer:

- (d) Máire has the following information about the mortar they will need for the wall:

For every 50 kg of cement, you will need 175 kg of sand.

Máire is going to use 30 kg of cement.

Find how many kilograms of **sand** she will need.



A large rectangular grid consisting of 12 columns and 10 rows of small squares, intended for calculating the amount of sand needed based on the given ratio.

Answer:

Question 4

- (a) Maitiú and Odhran buy a €10 lottery ticket. Maitiú pays €7 and Odhran pays €3. They agree to split any winnings in that ratio.

They win €234 400. Find how much money each of them will get.

Maitiú gets:	Odhran gets:

- (b) Maitiú is going to spend some of his winnings on a holiday to Florida. He changes €450 into dollars. The exchange rate is €1 = \$1·12.

Find how many dollars (\$) he will get.

Answer:	

- (c) Maitiú wants to know how long the flight from Dublin to Atlanta will take. He knows that the local time in Atlanta is five hours behind Ireland. He reads the following table. All times are local.

Departure from Dublin	Arrival in Atlanta
10: 10	14: 01

Find how long the flight will take.

Answer:	

- (d) Maitíú reads that the temperature in Florida is 86° Fahrenheit.
Use the formula below to convert 86° Fahrenheit to degrees Celsius.

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

Answer:

- (e) The table on the right shows four pairs of numbers that are equal in value.

Write each of the three numbers below into the correct line in the table.

You may use each number only once.

40% 4% $2 \cdot 6^2$

$\frac{3}{4}$	=	75%
0·04	=	
$\frac{2}{5}$	=	
6·76	=	

- (f) The table below shows four pairs of numbers. In three of the cases, the value of the original number has been changed in some way to make a new number.

Original Number	New Number	Change (if any)
2345·7	234·57	Divide by 10
34·67800	34·678	
564·7676	564·77	
56 789	57 000	

Complete the table by writing each description below into the correct row above.

Round to
the nearest 1000

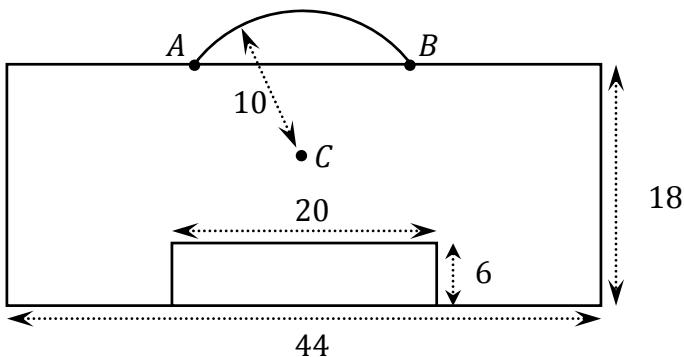
Round to
2 decimal places

No change
to the value

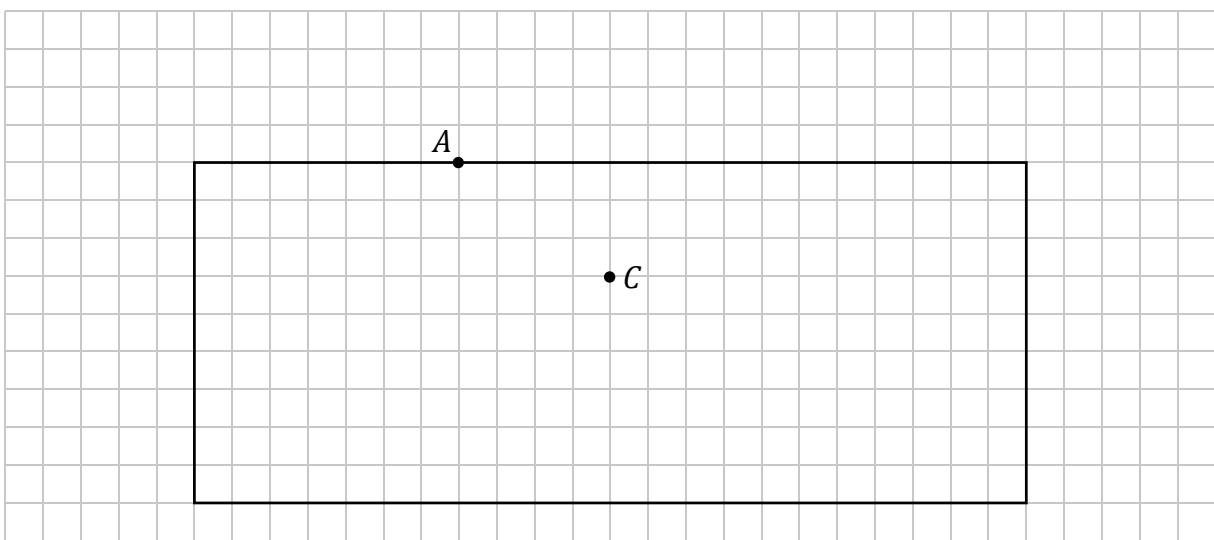
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Question 5

- (a) A penalty box from a soccer pitch is shown in the diagram below.
It is made up of two rectangles and an arc of a circle. All distances are in yards.
The arc from A to B is part of a circle with centre C and radius 10 yards.
The penalty box is symmetrical about a line through C .



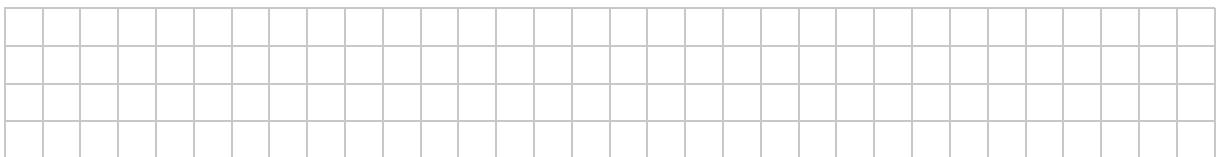
- (i) Part of a scaled diagram of the penalty box is shown below.
The length of the side of each small square in the grid represents 2 yards.
Use a compass and straight edge to **complete** the scaled diagram,
as accurately as you can. **Label** the point B .



- (ii) Use a ruler to measure the **distance** from A to B on your diagram, in cm.
Hence, or otherwise, find the **actual distance** from A to B , in yards.

Distance on diagram (cm) =

Actual distance (yards) =



- (b) The soccer pitch is in the shape of a rectangle. It is 105 m long and 68 m wide.

(i) Find the length of the **perimeter** of the soccer pitch.

	Answer:
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(ii) Find the **area** of the soccer pitch.

	Answer:
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- (c) Another pitch has an area of 6800 m^2 . It is being covered with grass seed.

One bag of seed will cover 500 m^2 of the pitch, and costs €120.

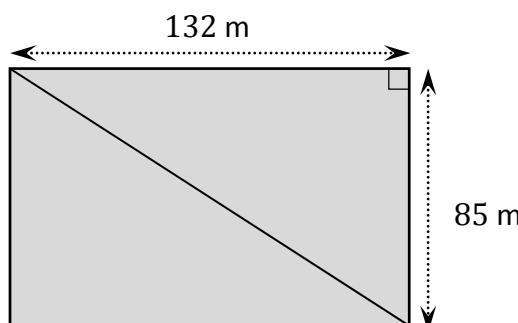
Only full bags of seed may be bought – it is not possible to buy part of a bag.

Find the **total cost** of the bags of seed needed to cover the pitch.

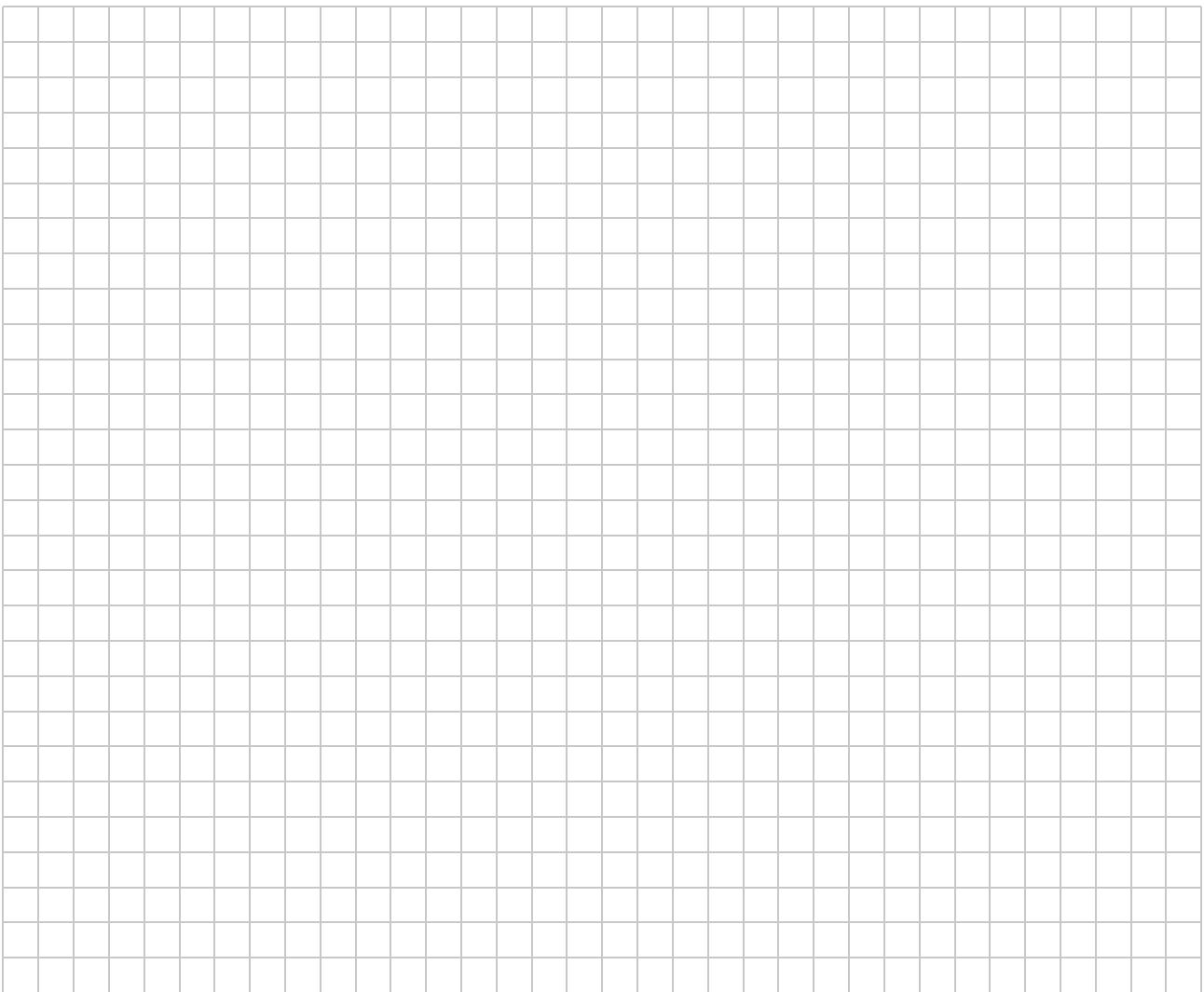
	Answer:
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- (d) A rectangular GAA pitch has a length of 132 m and a width of 85 m.

Use the theorem of **Pythagoras** to find the length of the **diagonal** of the pitch.



	Answer:
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