

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

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Candidate signature

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# GCSE MATHEMATICS

# H

Higher Tier

Paper 2 Calculator

Thursday 6 June 2019

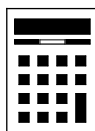
Morning

Time allowed: 1 hour 30 minutes

## Materials

For this paper you must have:

- a calculator
- mathematical instruments.



## Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

## Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

### For Examiner's Use

| Pages        | Mark |
|--------------|------|
| 2–3          |      |
| 4–5          |      |
| 6–7          |      |
| 8–9          |      |
| 10–11        |      |
| 12–13        |      |
| 14–15        |      |
| 16–17        |      |
| 18–19        |      |
| 20–21        |      |
| 22–23        |      |
| 24–25        |      |
| <b>TOTAL</b> |      |

## Advice

In all calculations, show clearly how you work out your answer.



J U N 1 9 8 3 0 0 2 H 0 1

Answer **all** questions in the spaces provided

Do not write  
outside the  
box

- 1** Circle the point that lies on the curve  $y = x^2 - 4x + 1$  **[1 mark]**

$(-1, 4)$

$(-1, -4)$

$(-1, -2)$

$(-1, 6)$

- 2** The height of a tree is 12 metres, correct to the nearest metre.  
Circle the error interval. **[1 mark]**

$11.5 \text{ m} \leq \text{height} < 12.5 \text{ m}$

$11.5 \text{ m} \leq \text{height} \leq 12.5 \text{ m}$

$11.5 \text{ m} < \text{height} \leq 12.5 \text{ m}$

$11.5 \text{ m} < \text{height} < 12.5 \text{ m}$



3  $2a$  is five times bigger than  $b$ .

Circle the ratio  $a : b$

[1 mark]

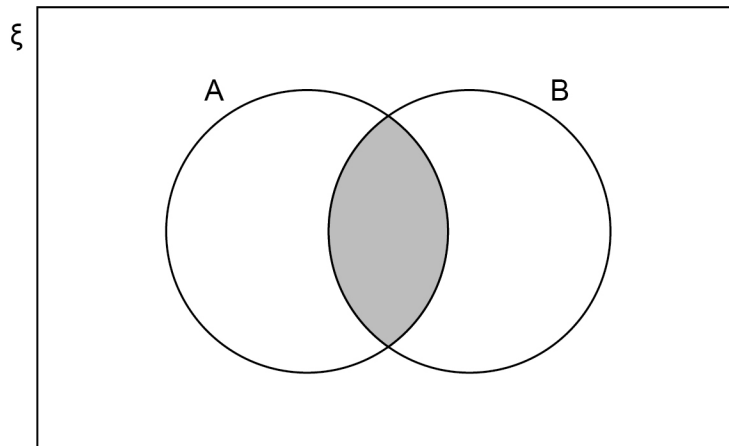
10 : 1

1 : 10

5 : 2

2 : 5

4



Which of these represents the shaded region?

Circle your answer.

[1 mark]

$A \cup B$

$(A \cap B)'$

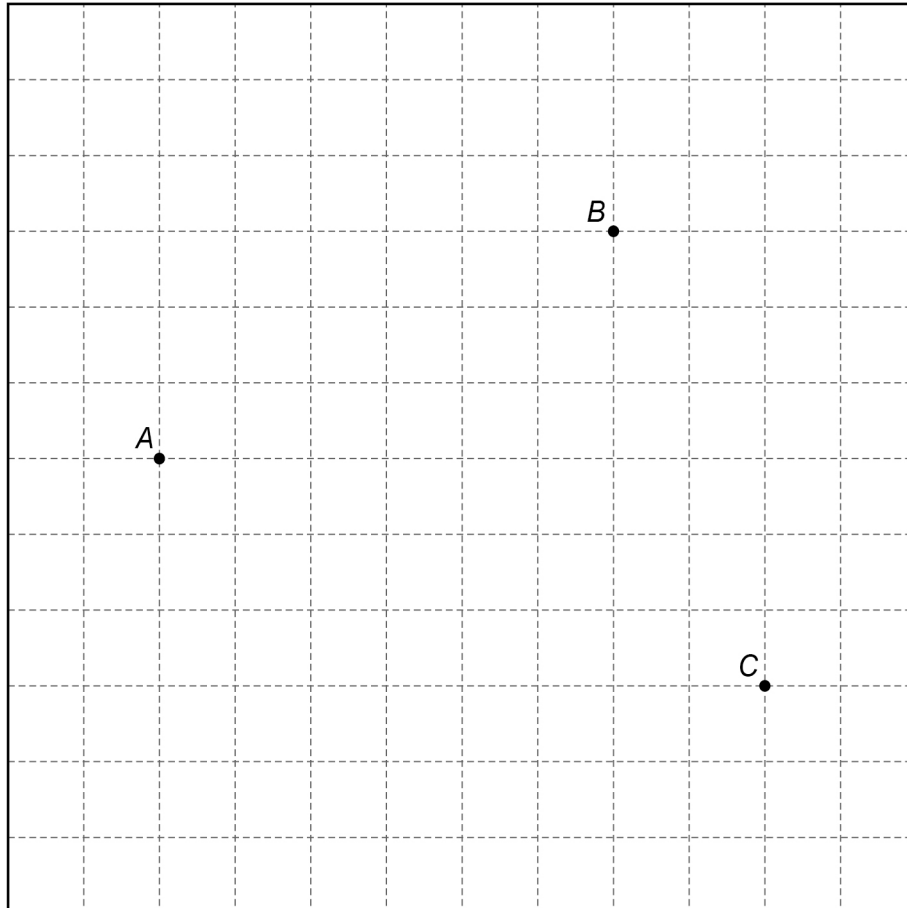
$A \cap B$

$A' \cup B'$

Turn over for the next question



- 5** Using ruler and compasses, show the region inside the grid that is  
less than 4 cm from  $A$   
and  
nearer to  $B$  than to  $C$ .  
Label the region  $R$ .  
Show all your construction lines.

**[3 marks]**

6

Beth drives 200 miles in 4 hours.

She drives the first 18 miles at an average speed of 36 mph

Work out her average speed for the rest of the journey.

**[3 marks]**


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Answer \_\_\_\_\_ mph

**Turn over for the next question**

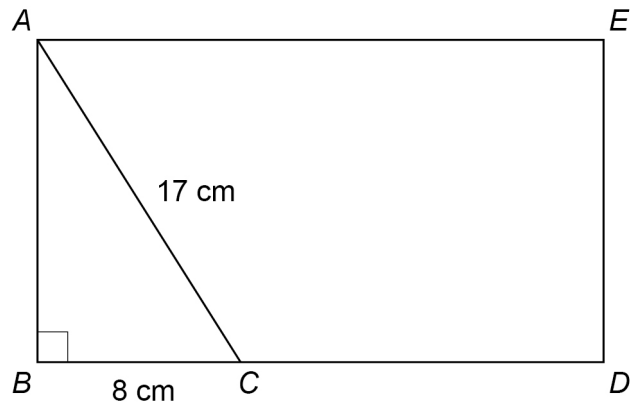


7

The diagram shows rectangle  $ABDE$  and right-angled triangle  $ABC$ .

$AC = 17 \text{ cm}$

$BC = 8 \text{ cm}$



Not drawn  
accurately

$BC : CD = 1 : 2$

Work out the area of rectangle  $ABDE$ .

[4 marks]

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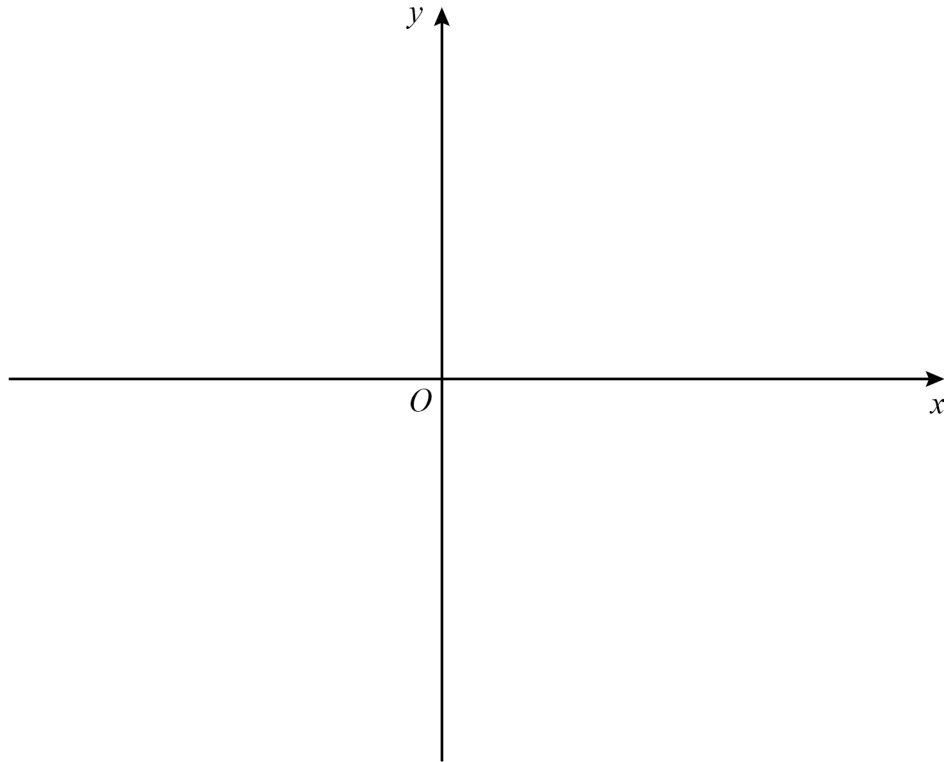
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Answer \_\_\_\_\_  $\text{cm}^2$



8

On the axes, sketch the curve  $y = x^3 - 2$ You **must** show the coordinates of the  $y$ -intercept.**[2 marks]**

Turn over for the next question



- 9 In a sport, injury time is added time played at the end of a match.  
The table shows the injury time,  $t$  (minutes) played in 380 matches.

| Injury time, $t$ (minutes) | Frequency |
|----------------------------|-----------|
| $0 < t \leq 2$             | 59        |
| $2 < t \leq 4$             | 158       |
| $4 < t \leq 6$             | 106       |
| $6 < t \leq 8$             | 45        |
| $8 < t \leq 10$            | 12        |

- 9 (a) Circle the **two** words that describe the data.

[1 mark]

continuous

discrete

grouped

ungrouped

- 9 (b) Which class interval contains the median?  
You **must** show your working.

[2 marks]

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Answer \_\_\_\_\_  $< t \leq$  \_\_\_\_\_





- 9 (c) What percentage of the matches had **more than** 6 minutes of injury time?

[2 marks]

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Answer \_\_\_\_\_ %

- 10  $x$  is an integer.

$$-4 < x \leq 2$$

and

$$2 \leq x + 3 < 9$$

Work out all the possible values of  $x$ .

[3 marks]

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Answer \_\_\_\_\_

Turn over ►



- 11 Joe and Kyle share an amount of money in the ratio  $7 : n$

Joe gets 35% of the money.

Work out the value of  $n$ .

[2 marks]

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Answer \_\_\_\_\_

- 12 A biased coin is thrown 250 times.

The relative frequency of Heads is worked out after every 50 throws.

|                               |     |      |     |      |     |
|-------------------------------|-----|------|-----|------|-----|
| <b>Total number of throws</b> | 50  | 100  | 150 | 200  | 250 |
| <b>Relative frequency</b>     | 0.4 | 0.29 | 0.4 | 0.32 | 0.3 |

Circle the best estimate of the probability of Heads.

[1 mark]

0.3

0.32

0.342

0.4



13

The amounts spent on clothes by 40 boys and 40 girls in one month were recorded.  
The table shows information about the amounts spent by the boys.

| Amount, $x$ (£)  | Midpoint | Number of boys |  |
|------------------|----------|----------------|--|
| $0 \leq x < 20$  |          | 22             |  |
| $20 \leq x < 40$ |          | 9              |  |
| $40 \leq x < 60$ |          | 6              |  |
| $60 \leq x < 80$ |          | 3              |  |
|                  |          | Total = 40     |  |

The mean for the girls was £35

Estimate the mean for the girls as a percentage of the mean for the boys.

[5 marks]

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Answer \_\_\_\_\_ %

Turn over ►



**14** Ali and Mel are making 3-digit codes.

The digit 0 is **not** used.

Ali only uses odd digits.

Mel only uses even digits.

**14 (a)** Ali can make  $x$  more codes than Mel.  
Assume that digits **cannot** be repeated.

Work out the value of  $x$ .

**[3 marks]**

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Answer \_\_\_\_\_

**14 (b)** In fact, digits **can** be repeated.

What does this tell you about the actual value of  $x$ ?

Tick **one** box.

**[1 mark]**

☐

It is bigger than my answer to part (a)

☐

It is smaller than my answer to part (a)

☐

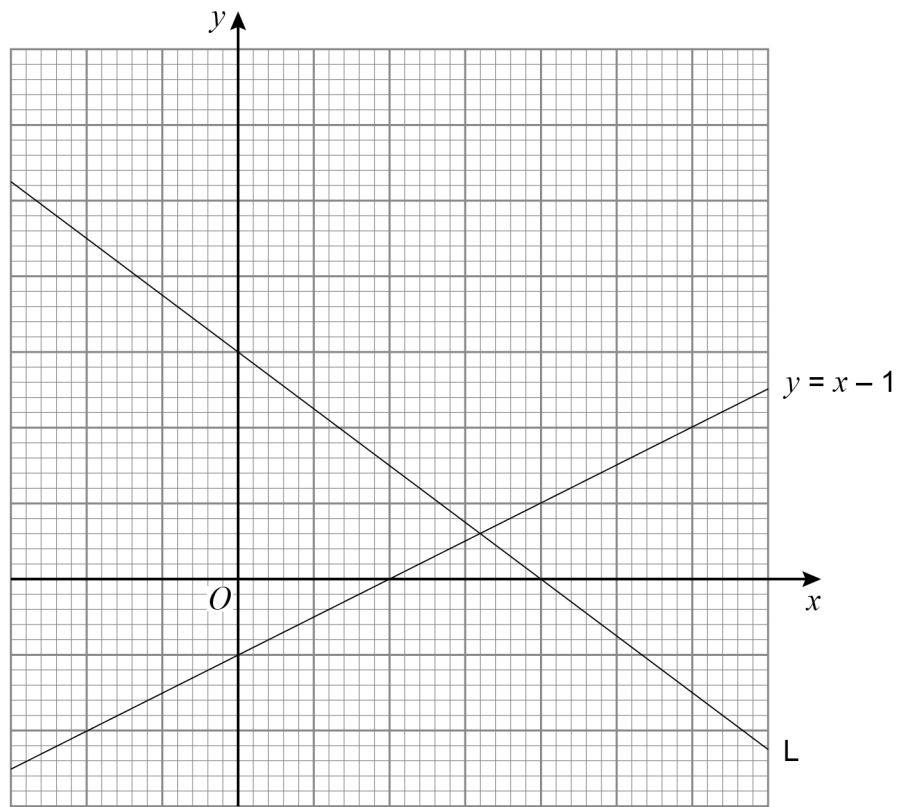
It is the same as my answer to part (a)



15

Here is line L and the graph of  $y = x - 1$ 

The scales of the axes are not shown.



Work out the equation of line L.

**[4 marks]**


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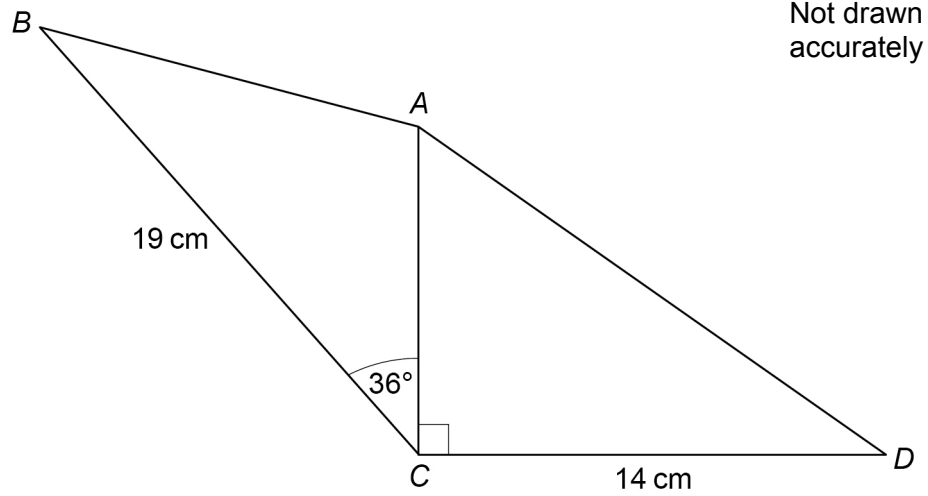


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Answer \_\_\_\_\_



16

 $ABC$  and  $ACD$  are triangles.The area of  $ACD$  is  $80.5 \text{ cm}^2$ Work out the area of  $ABC$ .

Give your answer to 3 significant figures.

**[4 marks]**


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Answer \_\_\_\_\_  $\text{cm}^2$ 

17

$$m = \frac{p - 2b}{2}$$

$p = 68.3$  correct to 1 decimal place.

$b = 8.7$  correct to 1 decimal place.

Work out the lower bound for  $m$ .

**[3 marks]**


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Answer \_\_\_\_\_

Turn over for the next question



18

In a bag there are blue discs, green discs and white discs.

There are four times as many blue discs as green discs.

number of blue discs : number of white discs = 3 : 5

One disc is selected at random.

Work out the probability that the disc is either blue or white.

**[3 marks]**

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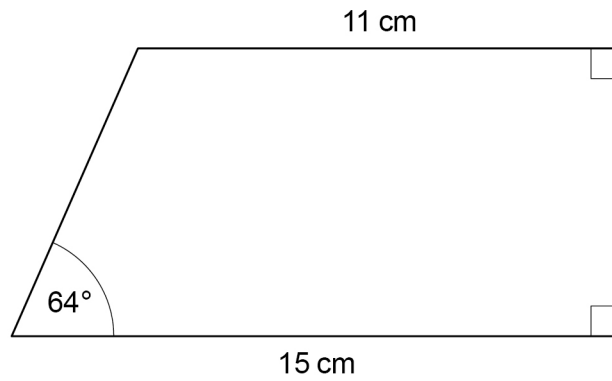
Answer \_\_\_\_\_





19

Work out the area of the trapezium.

Not drawn  
accurately**[4 marks]**


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Answer \_\_\_\_\_  $\text{cm}^2$ 

Turn over for the next question

Turn over ►



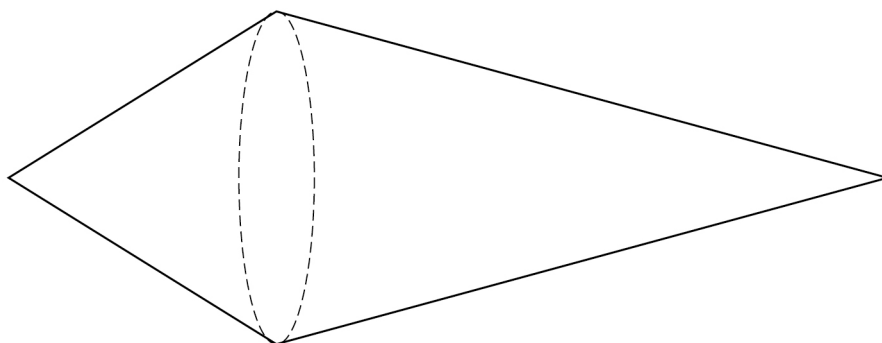
Expressions for consecutive triangular numbers are

Prove that the sum of two consecutive triangular numbers is always a square number.

[illegible]

21

A solid shape is made by joining two cones.  
Each cone has the same radius.



One cone has                      slant height =  $2 \times \text{radius}$

The other cone has              slant height =  $3 \times \text{radius}$

The total surface area of the shape is  $57.8\pi \text{ cm}^2$

Curved surface area of a cone =  $\pi r l$     where  $r$  is the radius and  $l$  is the slant height

Work out the radius.

**[3 marks]**

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Answer \_\_\_\_\_ cm



- 22** Show that  $(5\sqrt{3} - \sqrt{12})^2$  simplifies to an integer.

[3 marks]

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- 23** A and B are similar cuboids.

surface area of A : surface area of B = 16 : 25

Work out volume of A : volume of B

Circle your answer.

[1 mark]

4 : 5

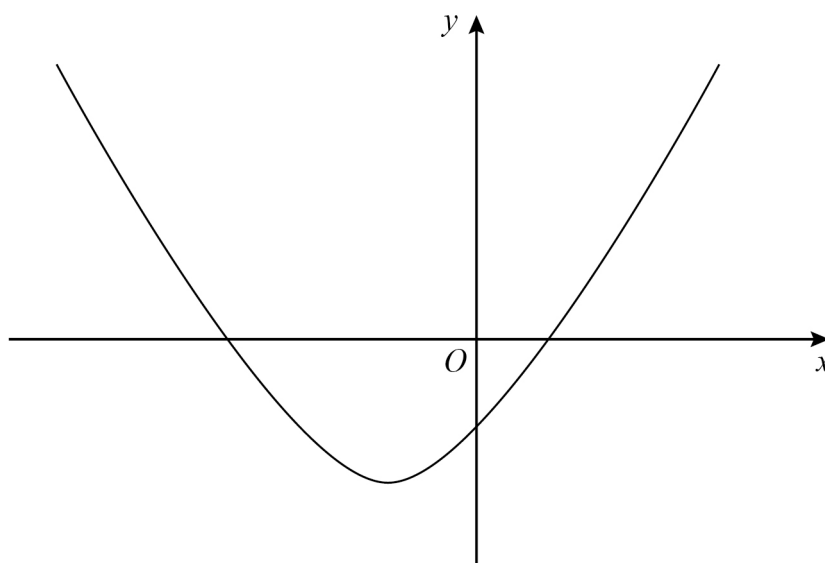
16 : 25

64 : 125

256 : 625



24 Here is a sketch of the curve  $y = x^2 + 4x - 12$



Work out the values of  $x$  for which  $x^2 + 4x - 12 < 0$

Give your answer as an inequality.

[3 marks]

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Answer \_\_\_\_\_



25

A sample of 50 eggs is taken from Farm A.

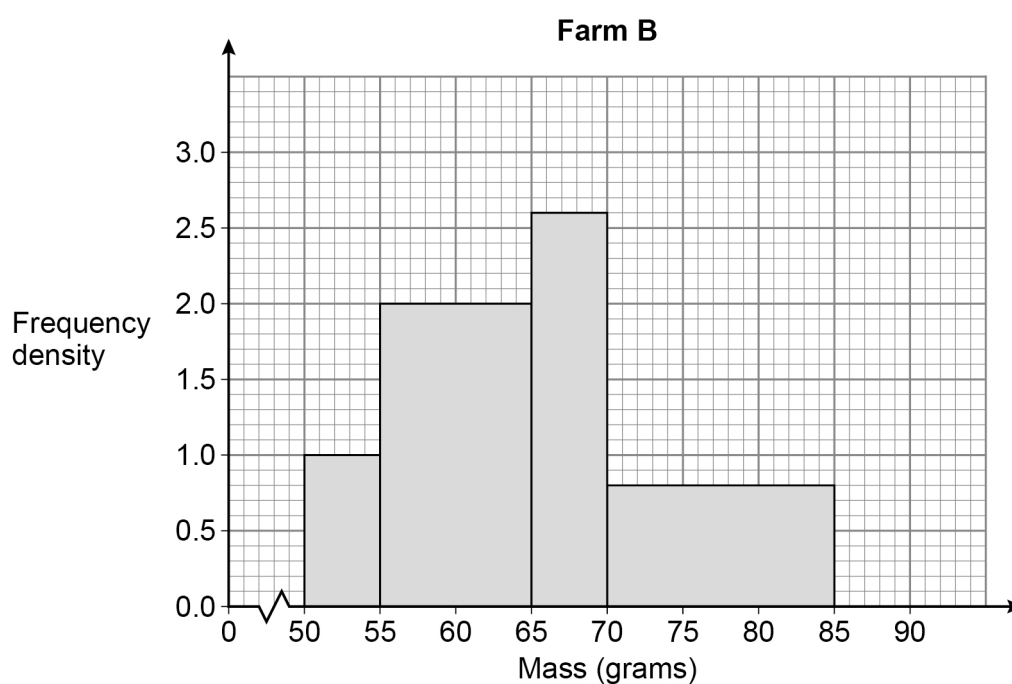
The table shows information about the masses of the eggs from Farm A.

**Farm A**

| Mass, $m$ (grams) | Frequency |
|-------------------|-----------|
| $53 < m \leq 58$  | 8         |
| $58 < m \leq 63$  | 19        |
| $63 < m \leq 68$  | 15        |
| $68 < m \leq 73$  | 8         |

A sample of 50 eggs is taken from Farm B.

The histogram shows information about the masses of the eggs from Farm B.



For medium eggs,  $53 \text{ g} < \text{mass} \leq 63 \text{ g}$

The Farm A sample has more medium eggs than the Farm B sample.

Using the table and the histogram, estimate how many more.

You **must** show your working.

**[4 marks]**

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Answer \_\_\_\_\_

**Turn over for the next question**



26

$$(x + 5)(x + 2)(x + a) \equiv x^3 + bx^2 + cx - 30$$

Work out the values of the integers  $a$ ,  $b$  and  $c$ .

**[3 marks]**

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 $a =$  \_\_\_\_\_ $b =$  \_\_\_\_\_ $c =$  \_\_\_\_\_



$$f(x) = \frac{2x}{5} - 1$$

**[5 marks]**

[illegible]

Answer \_\_\_\_\_

**END OF QUESTIONS**



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