



THIRD SPACE  
LEARNING

# Mathematics

## Paper 2

### (Calculator)

### Higher Tier

Edexcel GCSE

SET 3

# Mathematics Paper 2 (Non-Calculator) Higher Tier Edexcel

## GCSE SET 3

Name

Total marks

Paper length: 1hr 30mins



### Instructions

- Use black ink or ball-point pen.
- Fill in the boxes at the top of this page with your name, centre number and candidate number.
- Answer all questions.
- Answer the questions in the spaces provided – there may be more space than you need.
- You must show all your working.
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- Calculators may be used.

### Information

- The total mark for this paper is 80
- The marks for each question are shown in brackets – use this as a guide as to how much time to spend on each question.

Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	

### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

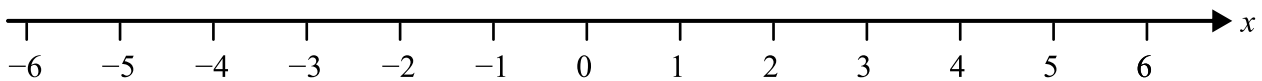
This practice paper is based on the topics from the **advanced information for the November 2024 exam series**.

*Please note, this practice paper is an example to help revision, these topics can be tested in other ways and other topics may be included in the actual papers*

- 1 (i) Solve  $3(x - 2) < 6$

-----  
(2)

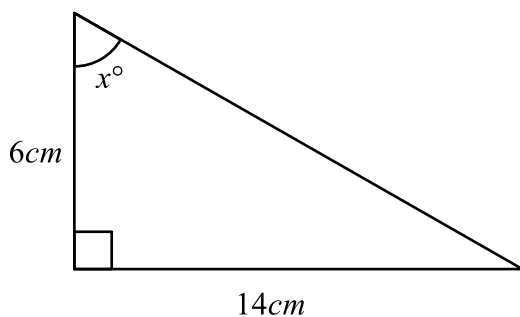
- (ii) Represent your solution on the number line below.



(2)

(Total for Question 1 is 4 marks)

- 2 Here is a right-angled triangle.



Work out the value of  $x$ .

Give your answer correct to 1 decimal place.

-----  
(Total for Question 2 is 3 marks)

3 Hollie, Izzy and Jess all roll the same dice a number of times.  
They each record how many times they roll a 6.

The table below shows their results.

	Hollie	Izzy	Jess
Number of rolls	20	50	200
Number of 6s	1	14	31

(a) Whose results give the best estimate of the probability of rolling a 6 with this dice?  
Explain your answer.

(1)

(b) Hollie says ‘I think the dice is biased’.

(i) Do Hollie’s results support this statement? Explain your answer.

(1)

(ii) Do the overall results support this statement? Explain your answer.

(1)

(Total for Question 3 is 3 marks)

- 4 A factory has 12 machines.

When all 12 machines are running, the factory produces 345600 bars of chocolate over an 8 hour operating window.

One day, 3 of the machines are broken.

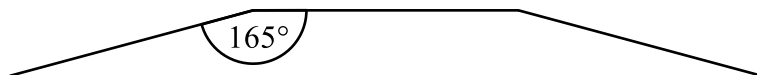
For how long must the remaining machines work to ensure the same number of chocolate bars are made?

Give your answer in hours and minutes.

\_\_\_\_\_ hours \_\_\_\_\_ minutes

**(Total for Question 4 is 3 marks)**

- 5 (a) Here is a section of a regular polygon



Not drawn  
accurately

Work out the number of sides of the polygon.

-----  
**(2)**

- (b) Would this shape tessellate?

-----  
**(1)**

**(Total for Question 5 is 3 marks)**

6 (a) Write the number 0.00238 in standard form.

-----  
(1)

(b) Work out  $5.4 \times 10^4 - 3.7 \times 10^3$   
Give your answer in standard form.

-----  
(2)

(c) Write the ratio  $3 \times 10^p : 4 \times 10^{p-1} : 5 \times 10^{p+1}$  in its simplest form.

-----  
(2)

**(Total for Question 6 is 5 marks)**

7  $\mathbf{a} = \begin{pmatrix} x \\ 5 \end{pmatrix} \quad \mathbf{b} = \begin{pmatrix} 1 \\ y \end{pmatrix}$

(a) Find  $3\mathbf{a} - 2\mathbf{b}$  as a column vector, in terms of  $x$  and  $y$ .

-----  
(2)

(b) Given that

$$\mathbf{a} + \mathbf{b} = \begin{pmatrix} 4 \\ 3 \end{pmatrix}$$

Find the values of  $x$  and  $y$

$x =$  -----

$y =$  -----

(3)

**(Total for Question 7 is 5 marks)**

- 8 Use your calculator to work out

$$\frac{\sqrt[3]{\sin(60) + 3.8^5}}{14^{\frac{1}{2}}}$$

Give your answer to 3 significant figures.

-----  
(Total for Question 8 is 2 marks)

---

- 9 Olivia invests £6000 in an account for one year.  
At the end of the year, interest is added into her account.

Olivia pays tax on this interest at a rate of 20%.

She pays £54 in tax.

Work out the percentage interest rate for the account.

-----  
(Total for Question 9 is 4 marks)

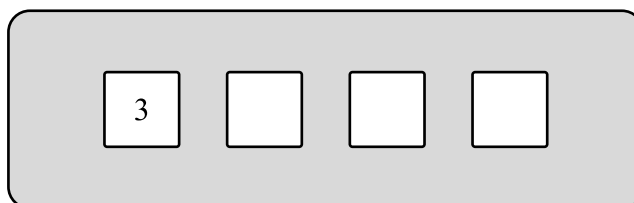
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**10** Rebecca has a combination lock with 4 numbers.

Each dial contains the numbers 0-9 inclusive.

She is trying to remember the code.



She knows the first number is 3, the last number is even and that the second and third numbers are different.

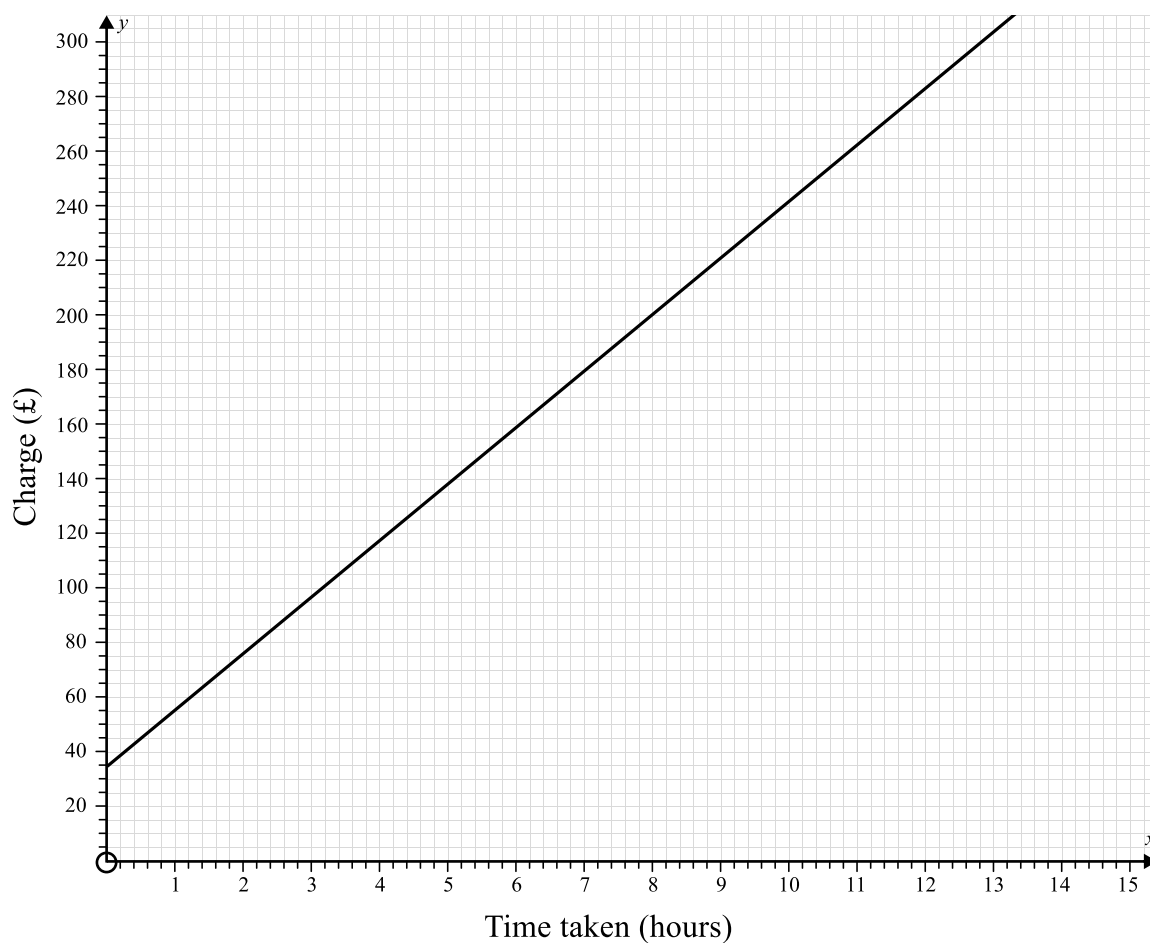
How many possible different codes are there?

-----  
(Total for Question 10 is 3 marks)

**11** Make  $p$  the subject of the formula  $m = \sqrt{\frac{3p}{4}}$

-----  
(Total for Question 11 is 2 marks)

**12** The graph gives information about the amount a builder charges per job.



(a) Find the gradient of the graph.

(2)

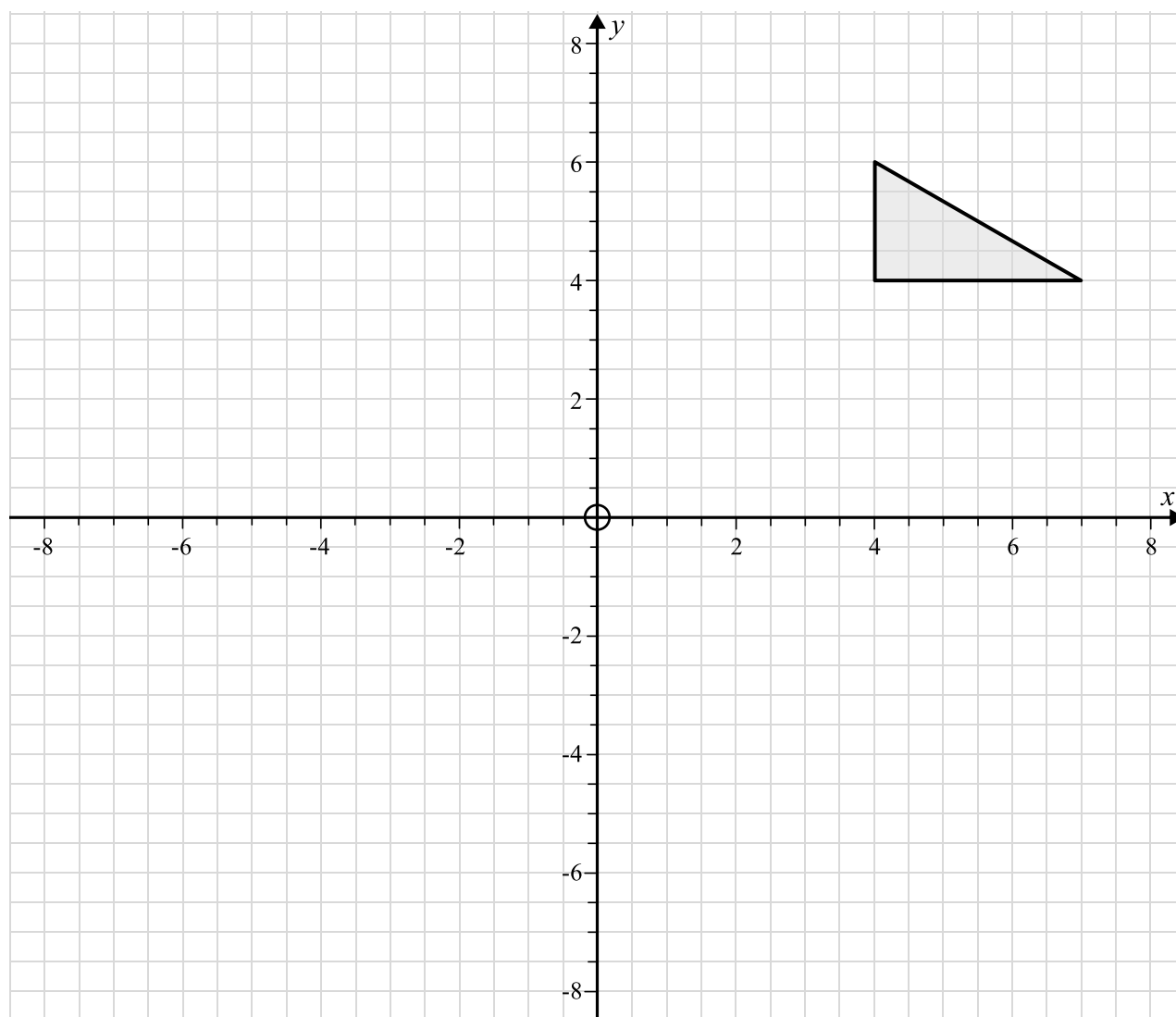
(b) Interpret what the gradient and the  $y$  intercept of the graph represent.

Gradient:

$Y$  intercept:

(2)

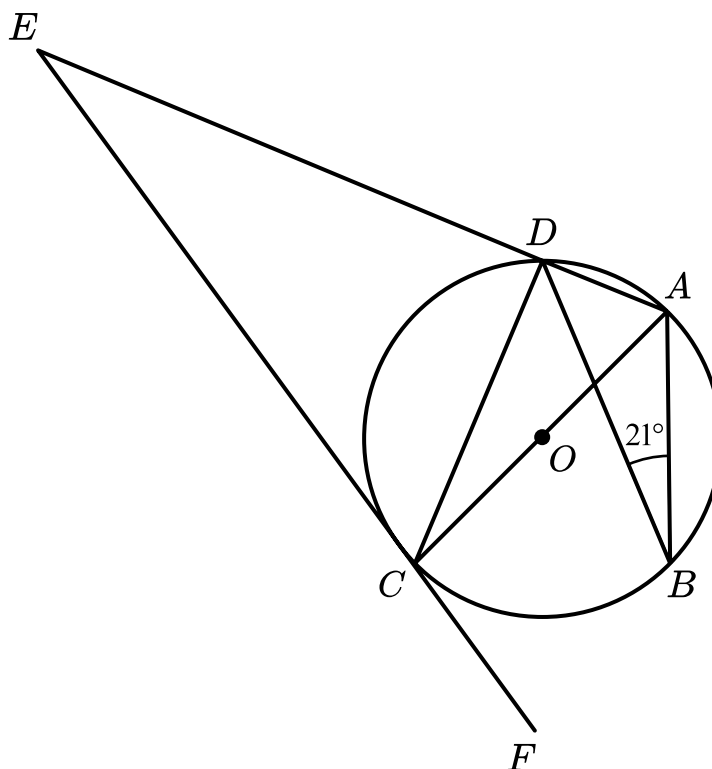
**(Total for Question 12 is 4 marks)**

**13**

Enlarge the shaded shape by scale factor  $-2$  with centre of enlargement  $(3, 3)$

**(Total for Question 13 is 3 marks)**

14



The points  $A$ ,  $B$ ,  $C$  and  $D$  lie on the circle.

The line  $EF$  is a tangent to the circle.

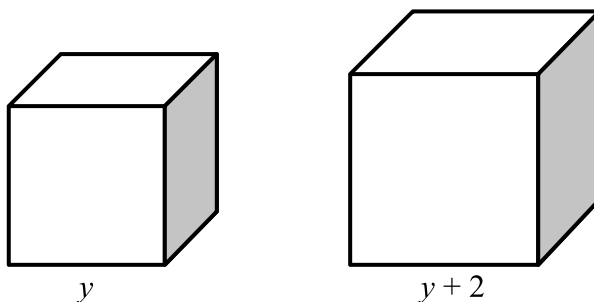
Angle  $ABD = 21^\circ$

Work out the size of angle  $DEC$ .

You must give a reason for each stage of your working.

(Total for Question 14 is 5 marks)

- 15 Here are two cubes. The first cube has side length  $y$  and the second cube has side length  $y + 2$ .



The volume of the larger cube is  $296\text{cm}^3$  greater than the volume of the smaller cube.

- (a) Show that  $y^2 + 2y - 48 = 0$

(3)

- (b) Work out the volume of the smaller cube.

-----  $\text{cm}^3$

(3)

**(Total for Question 15 is 6 marks)**

- 16** In a hotel room, the ratio of single rooms : twin rooms is 1 : 6.  
The ratio of twin rooms : family rooms is 5 : 2.  
There are 21 more family rooms than single rooms.

Work out the total number of rooms in the hotel.

**(Total for Question 16 is 3 marks)**

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- 17** The number of foxes living in a habitat at the end of the year  $n$  is  $F_n$ .  
The number of foxes living in the habitat at the end of the next year is given by

$$F_{n+1} = 1.4 F_n - 10$$

The number of foxes living in the habitat at the end of 2021 was 50.  
How many foxes will be living in the habitat at the end of 2024?

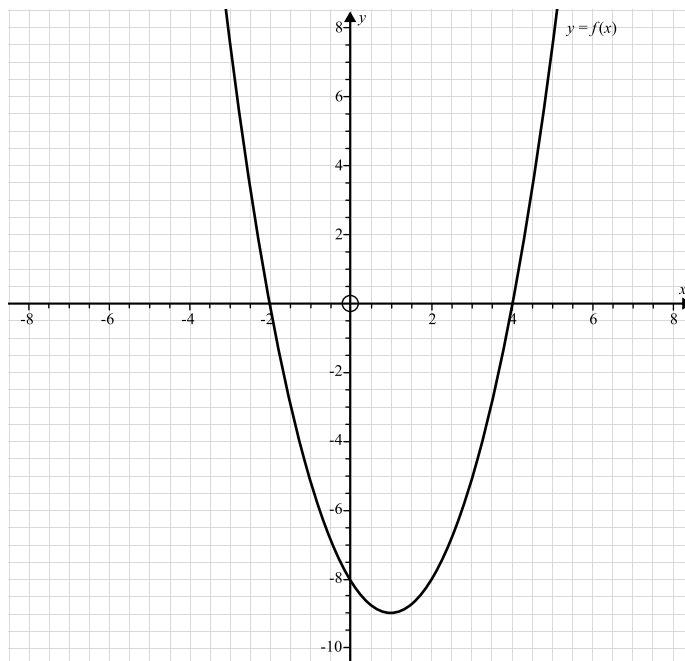
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**(Total for Question 17 is 3 marks)**

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**18** Show that  $\frac{10x - 5}{4x + 3} \div \frac{8x^2 - 10x + 3}{16x^3 - 9x}$  can be simplified to  $ax$  where  $a$  is an integer.

**(Total for Question 18 is 4 marks)**

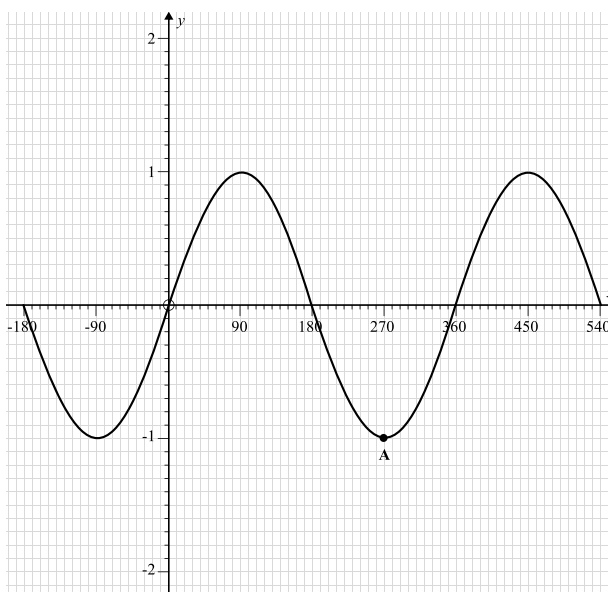
**19** Shown is the graph of the curve with equation  $y = f(x)$



(a) On the grid above, sketch the graph of the curve with equation  $y = f(x + 2)$

**(2)**

(b) Here is a sketch of the graph  $y = \sin(x)$ .



Point  $A$  lies on the graph of  $y = \sin(x)$  and has coordinates  $(270, -1)$ .

The graph is transformed and the equation of the resultant graph is  $y = \sin(x + 90) + 1$

Write down the coordinates of point  $A$  after the transformations.

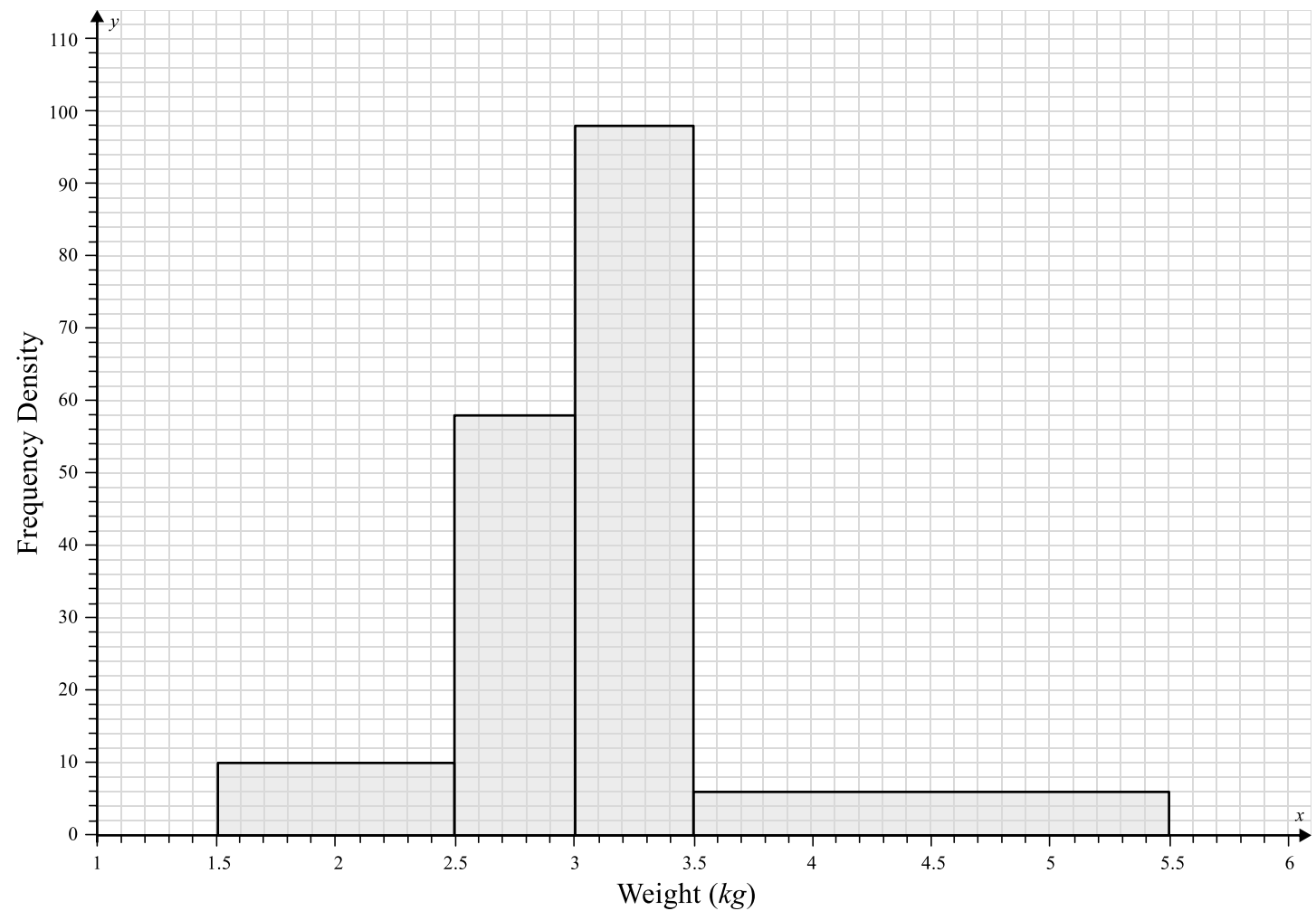
( \_\_\_\_\_ , \_\_\_\_\_ )

**(2)**

**(Total for Question 19 is 4 marks)**



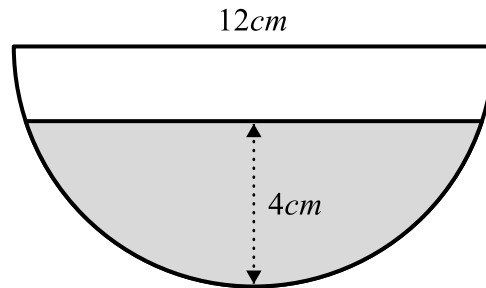
20 The weight of 100 babies are recorded.  
The results are shown on this histogram.



Use the histogram to estimate the mean weight of the babies.

----- *kg*  
**(Total for Question 20 is 5 marks)**

- 21** The cross-section of a container is a semi-circle with diameter  $12\text{cm}$ .  
The length of the container is  $20\text{cm}$ .  
The container is filled with water to a depth of  $4\text{cm}$ .



Calculate the number of litres of water in the container.  
Give your answer correct to 2 significant figures.

-----  
**(Total for Question 21 is 6 marks)**

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