



THIRD SPACE
LEARNING

Mathematics

Paper 4

(Calculator)

Higher Tier

OCR GCSE

SET 3

Mathematics Paper 4 (Calculator) Higher Tier OCR GCSE

SET 3

Name

Total marks

Paper length: 1hr 30mins



Question	Mark
1	
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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 100
- The marks for each question are shown in brackets – use this as a guide as to how much time to spend on each question.

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.

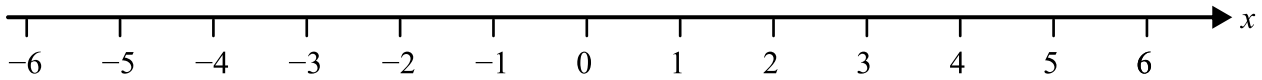
This practice paper is based on the topics from the **advanced information for the November 2024 exam series**.

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 (a) Solve $3(x - 2) < 6$

..... [2]

(b) Represent your solution on the number line below.



[2]

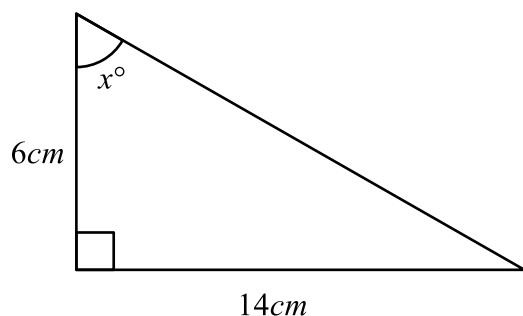
2 Calculate

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

Give your answer to 3 significant figures.

..... [2]

- 3 Here is a right-angled triangle.



Work out the value of x .

Give your answer correct to 1 decimal place.

.....° [3]

- 4 Strawberries are sold in containers of 250g, 400g or 600g.

Strawberries	Strawberries	Strawberries
250g	400g	600g
£1.90	£2.20	£3.60

Which container is the best value for money?

You must show all of your working.

..... [4]

- 5 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’.

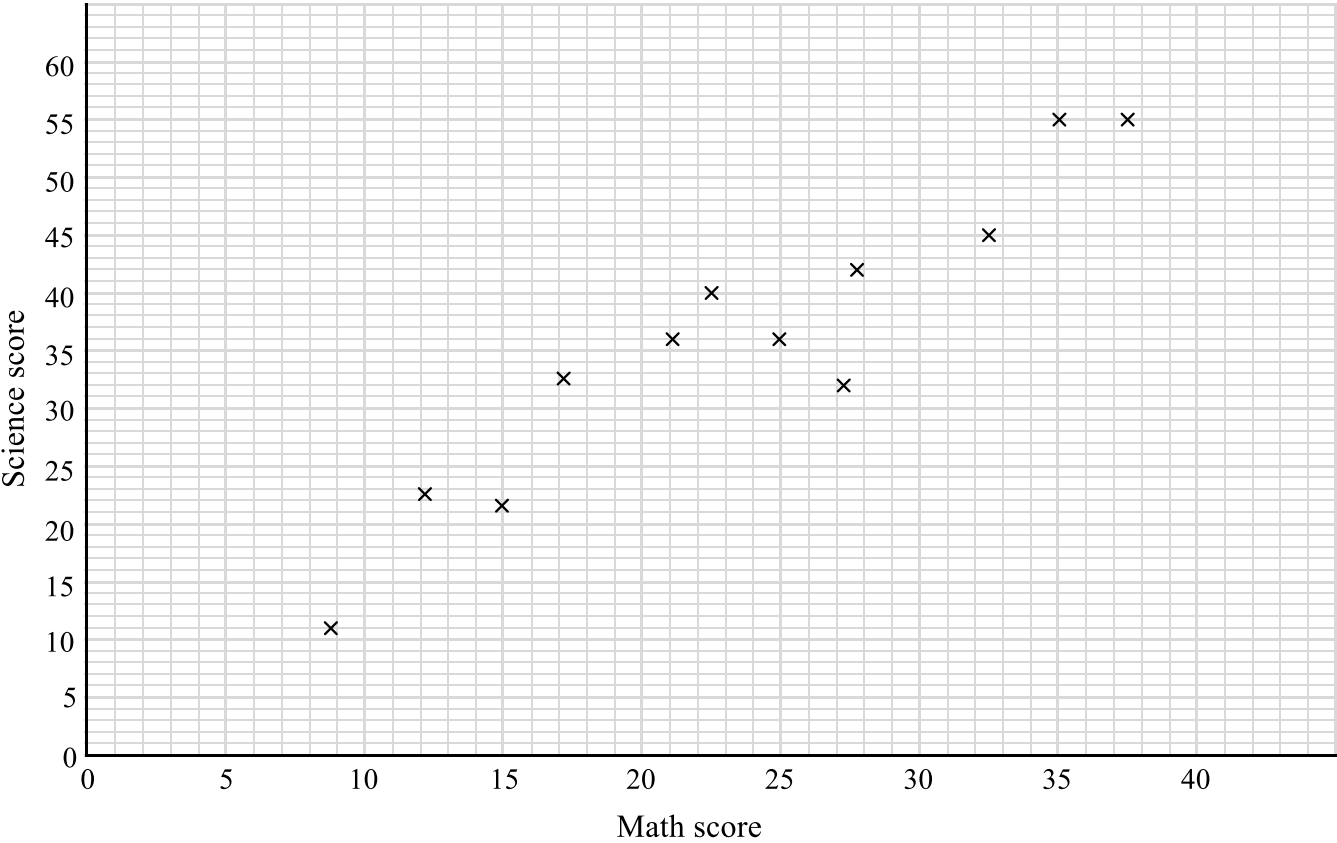
- (i) Do Hollie’s results support this statement? Explain your answer.

[1]

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

[1]

- 6 Some students each completed some maths homework and some science homework.
The maths test was scored out of 40 and the science test was scored out of 60.
This scatter diagram shows the maths and science results of 12 students.



- (a) The table shows the scores for two more students.
Plot these on the scatter diagram.

Maths	20	31	15
Science	38	32	30

[2]

- (b) Describe the type of correlation shown in the scatter diagram.

(b) [1]

- (c) By drawing a line of best fit, estimate the science score for a student who scored 30 on their maths test.

(c) [2]

- (d) To pass either test, students needed to score at least 60% on that test.
Work out the percentage of students who passed both tests.

(d) [4]

-
- 7 (a) Write the number 0.00238 in standard form.

(a) [1]

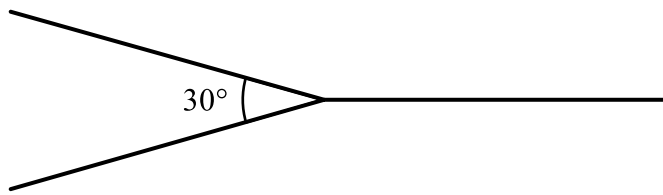
- (b) Work out $5.4 \times 10^4 - 3.7 \times 10^3$
Give your answer in standard form.

(b) [2]

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

(c) [2]

- 8 Three polygons meet at a point.



Not drawn
accurately

One of the polygons has an interior angle of 30° .

The other two polygons are identical, regular polygons.

Work out how many sides each of the two regular polygons have.

You must show your working.

----- [4]

- 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.

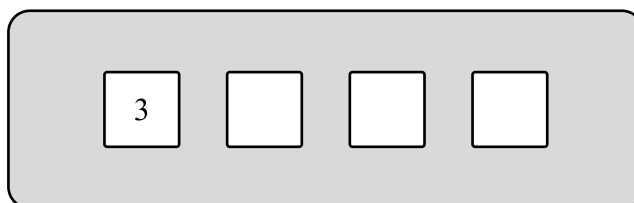
Work out the percentage interest rate for the account.

----- [4]

- 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.

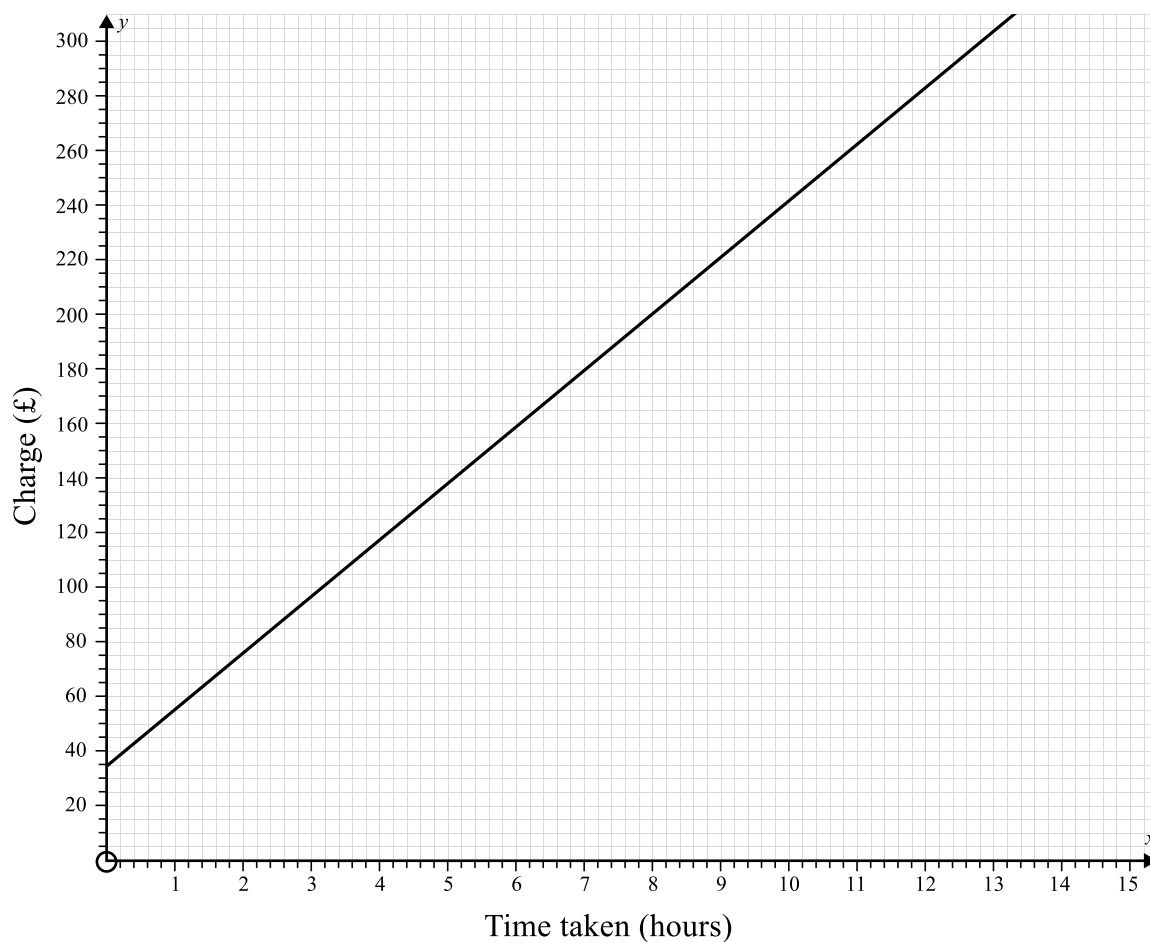
How many possible different codes are there?

..... [3]

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

..... [2]

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:

..... [1]

Y - intercept:

..... [1]

- 13** The area of a field is $2500m^2$ correct to 2 significant figures.

The length of the field is $44m$ to the nearest metre.

Work out the upper bound for the width of the field.

Give your answer to 3 decimal places.

You must show all of your working.

..... m [3]

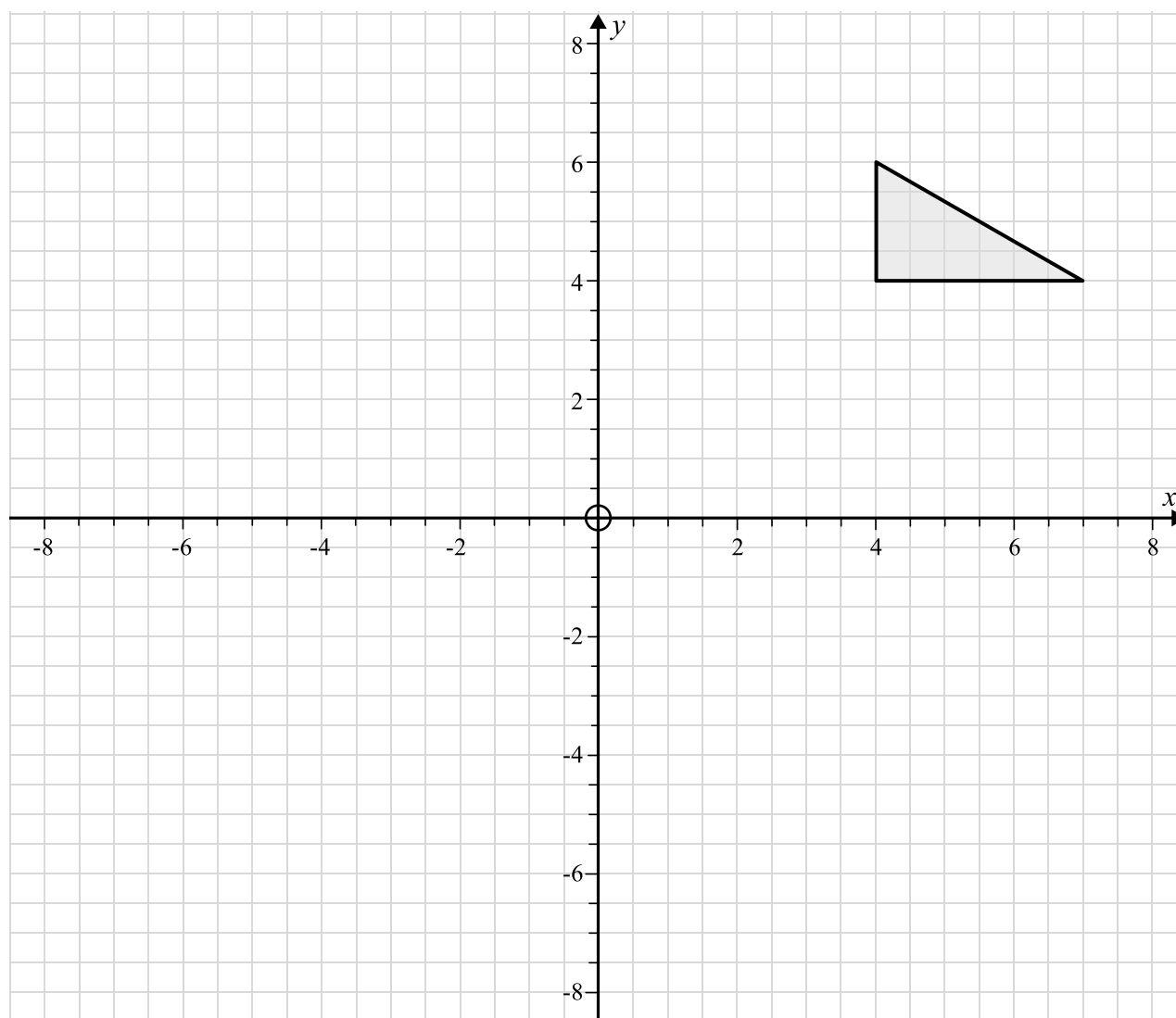
- 14** Here are the first five terms of a sequence.

2 9 20 35 54

Find an expression, in terms of n , for the n th term of this sequence.

..... [3]

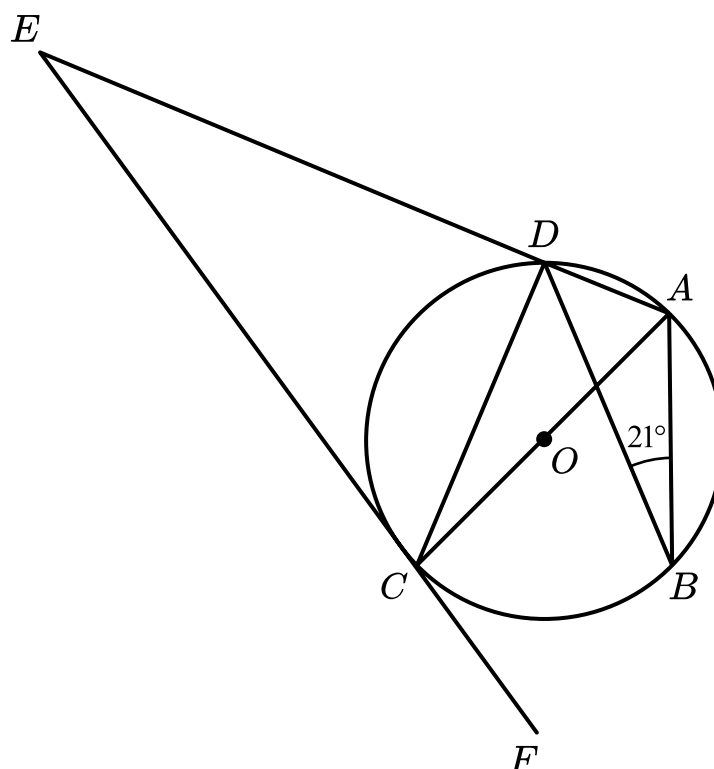
15



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

[3]

16



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

The line EF is a tangent to the circle.

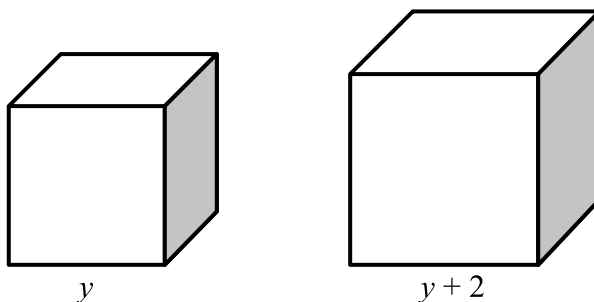
Angle $ABD = 21^\circ$

Work out the size of angle DEC .

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

Angle $DEC = \text{-----}^\circ$ [5]

- 17 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 296cm^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.

(b) cm^3 [3]

- 18** 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.

----- [3]

- 19** Prove algebraically that the sum of the squares of any two consecutive odd numbers is always even.

[4]

20 Fergus bought a house at the start of 2022.

Fergus assumes the value of the house, £ V , can be predicted using the formula

$$V = 225000 \times 1.032^n$$

where n is the number of years after the start of 2022.

(a) Write down the value of the house at the start of 2022.

(a) [1]

(b) Explain how you know that the value of the house is expected to increase each year.

.....
.....
[1]

(c) Write down the percentage increase per year.

(c) [1]

(d) Calculate the predicted value of the house at the start of 2025.

(d) [2]

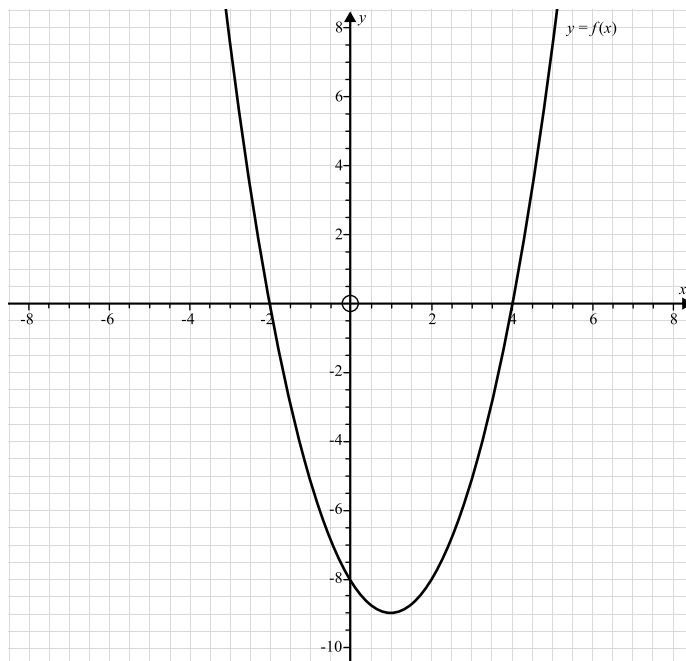
(e) According to the model, at the start of what year will the value of the house first be over £275000?

(e) [2]

- 21** 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.

[4]

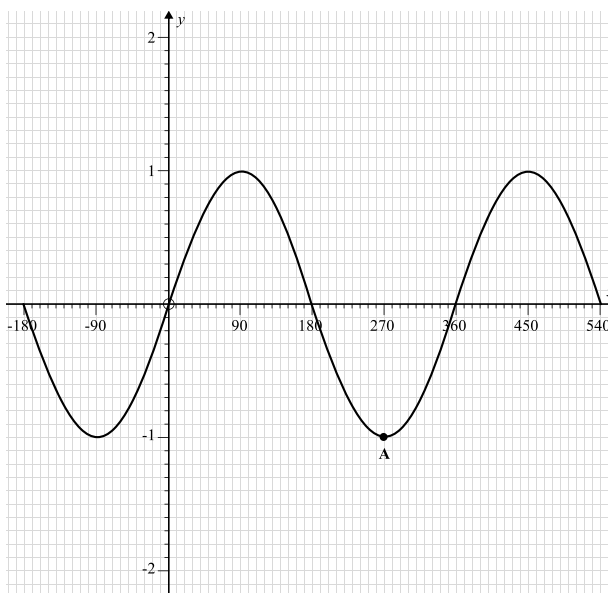
22 Shown is the graph of the curve with equation $y = f(x)$



(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 $y = \sin(x)$.



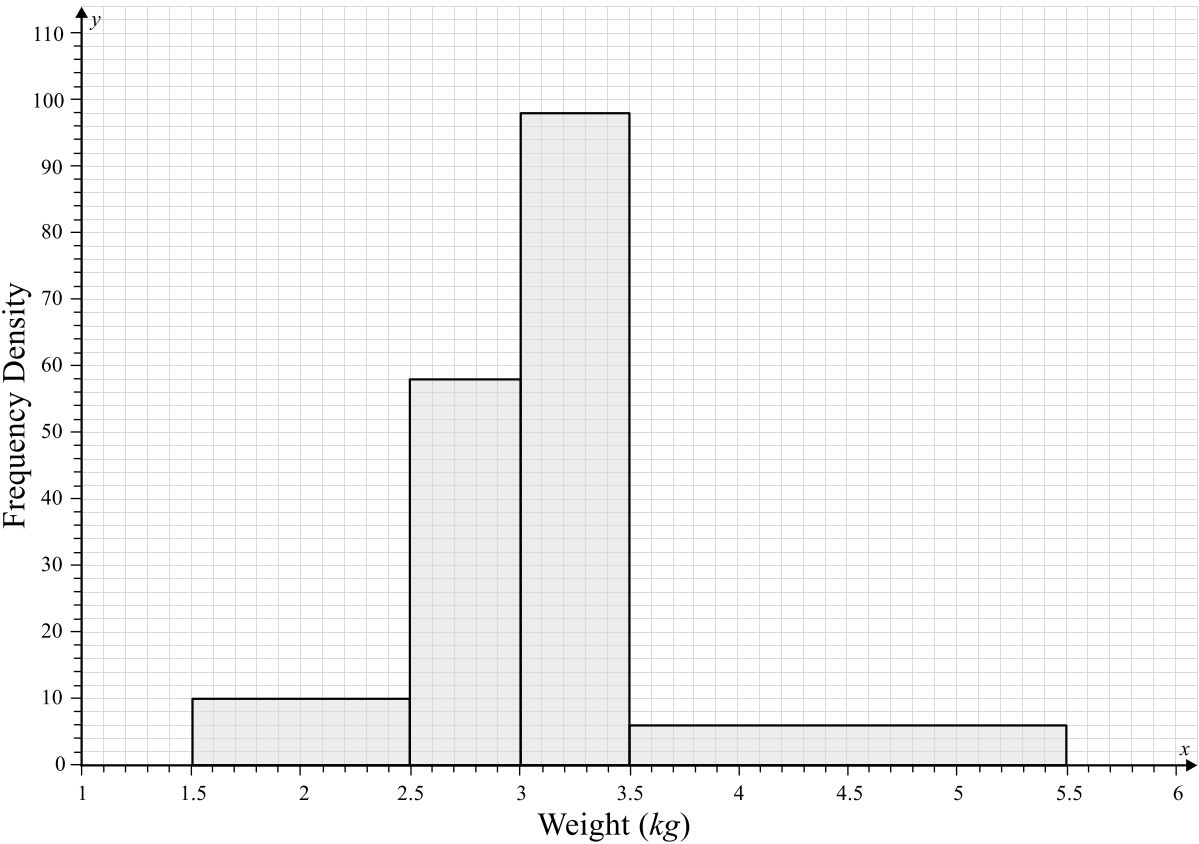
Point A lies on the graph of $y = \sin(x)$ and has coordinates $(270, -1)$.

The graph is transformed and the equation of the resultant graph is $y = \sin(2x) + 1$

Write down the coordinates of point A after the transformations.

(b) (_____ , _____) [2]

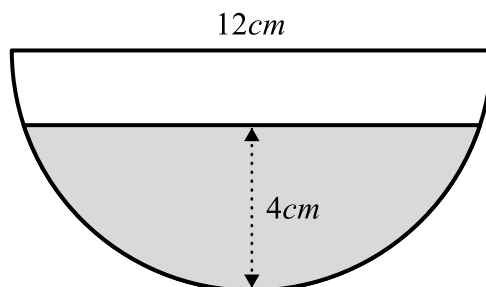
23 The weight of 100 babies is recorded.
The results are shown on this histogram.



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

----- *kg* [5]

- 24** The cross-section of a container is a semi-circle with diameter 12cm .
The length of the container is 20cm .
The container is filled with water to a depth of 4cm .



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

----- [6]

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