AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE MATHEMATICS

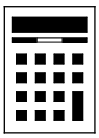
H

Higher Tier Paper 3 Calculator

Monday 11 November 2024 Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:



- a calculator
- mathematical instruments
- the Formulae Sheet (enclosed).

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.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- 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.

Advice

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

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	
TOTAL	

Answer **all** questions in the spaces provided.

Do not write outside the box

1 Work out the reciprocal of $\frac{10}{3}$

Give your answer as a decimal.

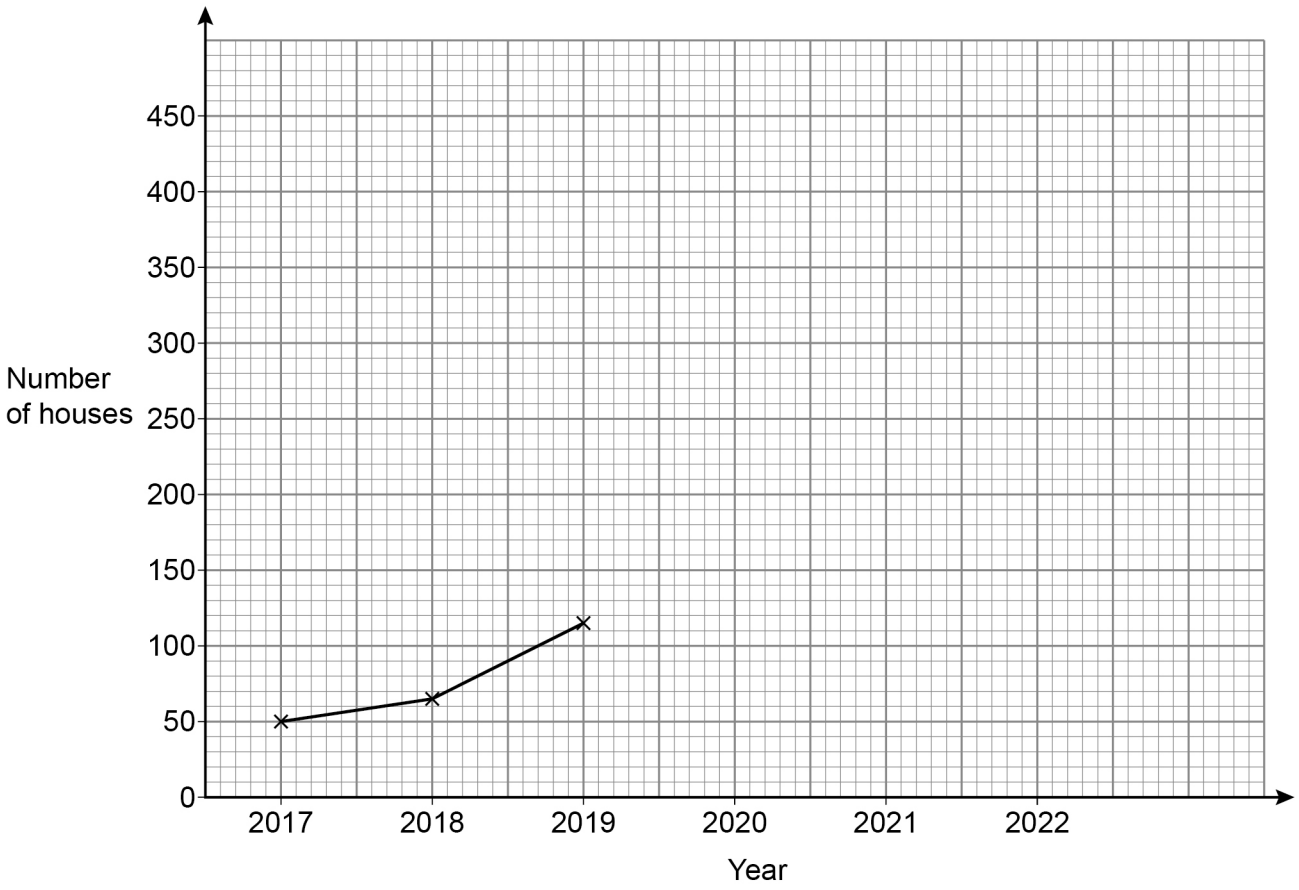
[2 marks]

Answer _____

Do not write outside the box

2 The table shows information about the number of houses with solar panels in a town.

Year	2017	2018	2019	2020	2021	2022
Number of houses	50	65	115	210	275	350



2 (a) Complete the graph.

[2 marks]

2 (b) Use the graph to estimate the number of houses with solar panels in 2023

[1 mark]

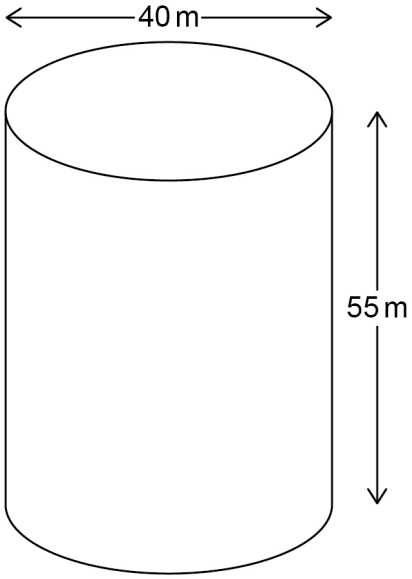
Answer _____

5

Turn over ►

Do not write outside the box

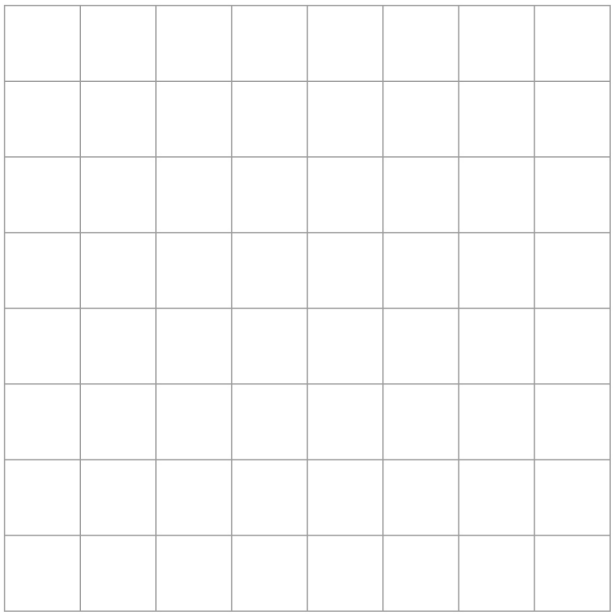
3 A building in the shape of a cylinder has diameter 40 m and height 55 m



3 (a) On the centimetre grid, draw a **plan** of the building.

Use a scale of 1 cm to 10 m

[2 marks]

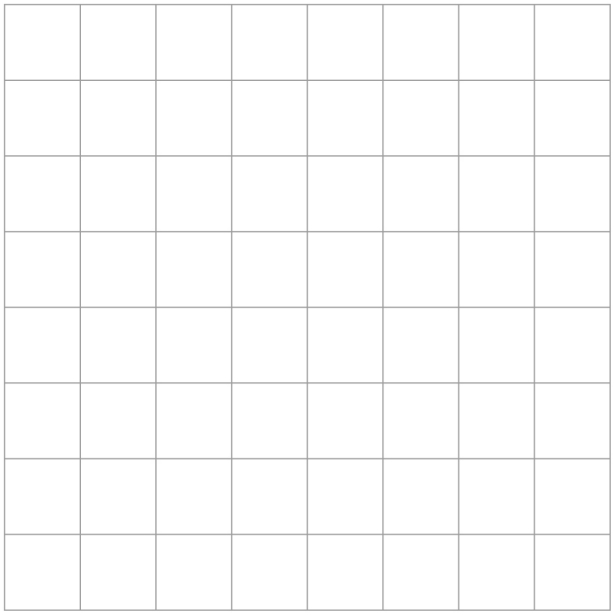


Do not write outside the box

3 (b) On this centimetre grid, draw the **front elevation** of the building.

Use a scale of 1 cm to 10 m

[2 marks]



Turn over for the next question

4

Do not write outside the box

4 To the **nearest pound**, Rosie has £12

She wants to buy 6 drinks.

Each drink costs £1.89

Show that Rosie **definitely** has enough money to buy the 6 drinks.

[3 marks]

5 The total cost of a taxi ride is calculated by adding

a fixed charge of £4

and

a charge of £2 per mile.

Write a formula to work out the total cost, £C, of a journey of m miles.

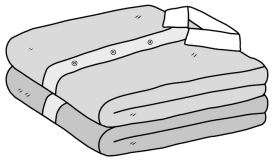
[2 marks]

$C =$ _____

Do not write outside the box

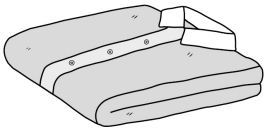
6 Three shops sell shirts.

Shop A



Pack of 2 £19.00

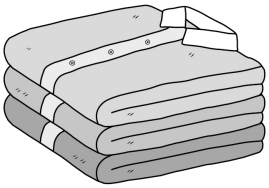
Shop B



Was £12.40

Now 25% off

Shop C



Pack of 3 £37.40

Buy one pack, get another pack half price

At which shop is it cheapest to buy **6 shirts**?

Show working to support your answer.

[5 marks]

Answer _____

10

Turn over ►

Do not write outside the box

7 (a) At a school

there are 912 students

the ratio of students to teachers is 15.2 : 1

The number of students stays the same.

The number of teachers increases by 2

Work out the new ratio of students to teachers.

Give your answer in the form n : 1

[3 marks]

Answer _____ : 1

7 (b) On a school trip, one teacher is needed for every group of 10 or fewer students.

72 students want to go on the trip.

Lexi tries to work out how many teachers are needed.

72 ÷ 10 = 7.2 7 teachers are needed.

What is wrong with her answer?

[1 mark]

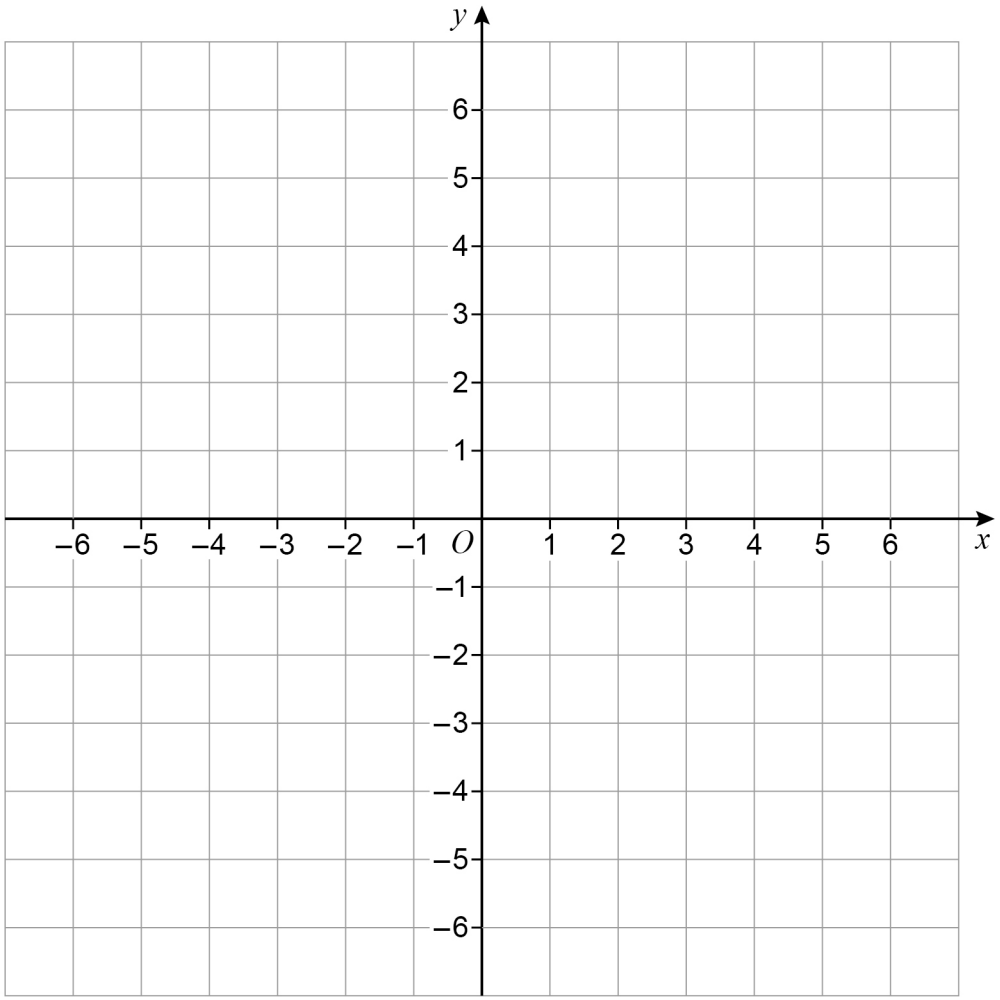
Do not write outside the box

8 A triangle is drawn using the lines

$y = x$

$x = -2$

$y = 4$



Work out the coordinates of the **three** vertices of the triangle.

[4 marks]

Answer (_____ , _____)

(_____ , _____)

(_____ , _____)

8

Turn over ►

Do not write outside the box

9 When x is divided by 2 the remainder is 1

When x is divided by 3 the remainder is 1

When x is divided by 4 the remainder is 1

Work out **two** possible values of x.

[2 marks]

$x =$ _____ and $x =$ _____

Do not write outside the box

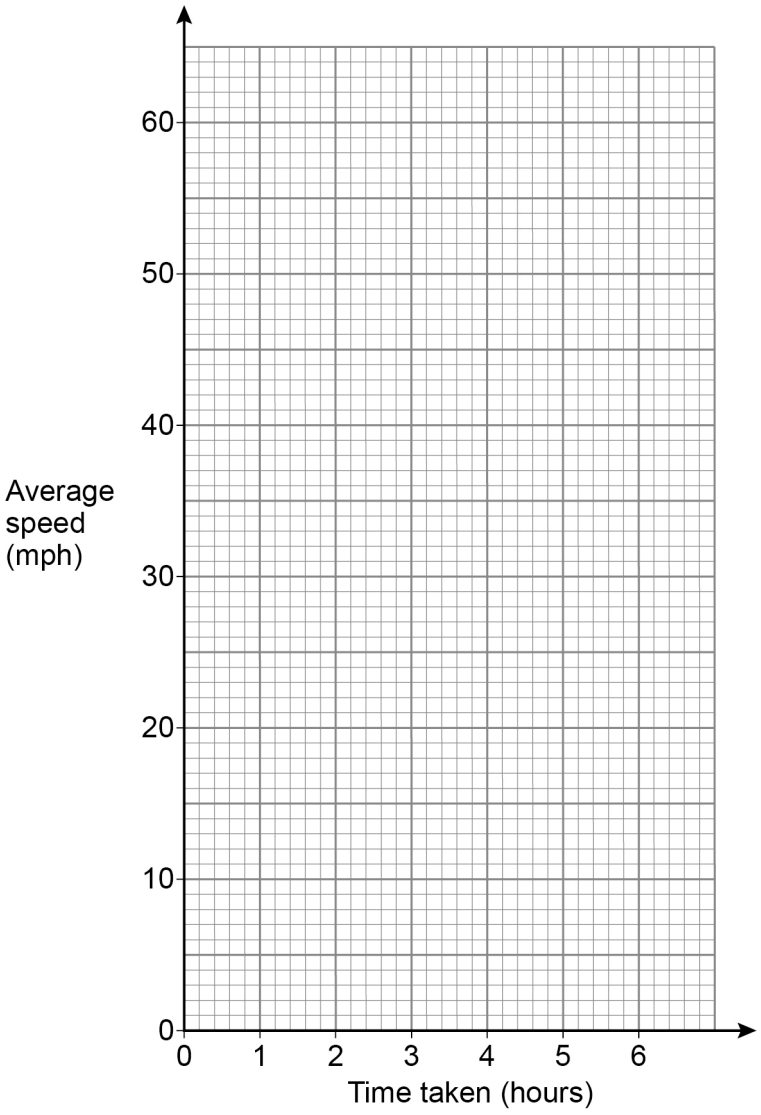
10 A car will travel 60 miles.

Draw a graph to show the **average speed** of the car for times taken between 1 hour and 6 hours.

You may use the table to help you.

[3 marks]

Time taken (hours)	1	2	3	4	5	6
Average speed (mph)	60	30				10



5

Do not write outside the box

11 Factorise fully $12t + 4t^3$

[2 marks]

Answer _____

12 The population of a country is now 67 200 000

The population is predicted to

increase by 1% per year for 6 years

and then

decrease by 1.2% per year for 2 years.

Work out the predicted population of the country 8 years from now.

Give your answer to 3 significant figures.

[4 marks]

Answer _____

Do not write outside the box

13 A bag contains one £5 note, one £10 note, one £20 note and one £50 note.

Amaan picks **two** of the notes at random without replacement.

Work out the probability that he has picked **at least** £30

[2 marks]

Answer _____

Turn over for the next question

8

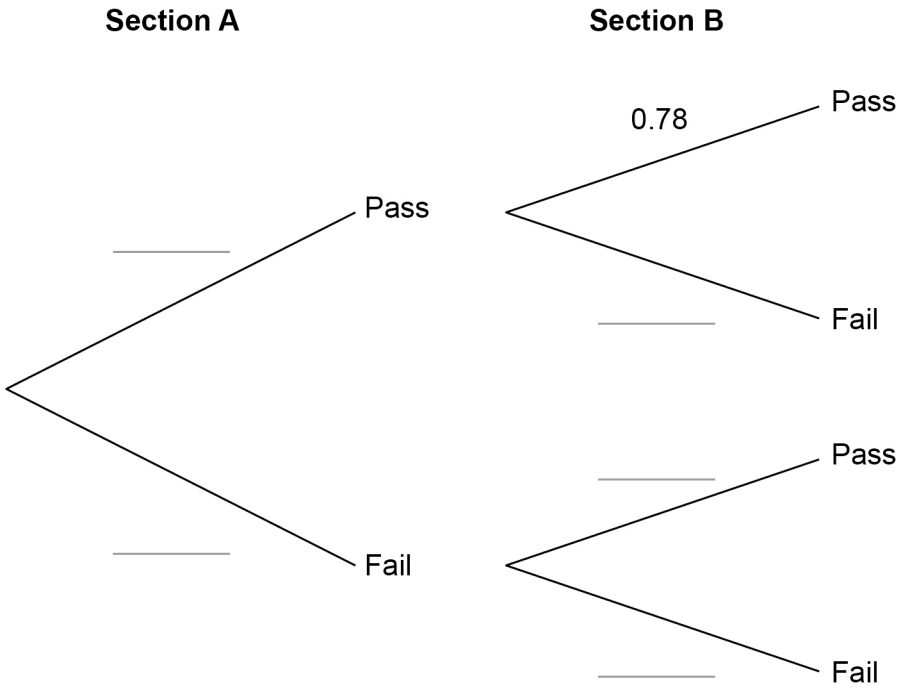
Do not write outside the box

14 A test consists of two sections, A and B.

- 85% of people pass section A.
- 78% of people who **pass** section A also **pass** section B.
- 36% of people who **fail** section A also **fail** section B.

14 (a) Complete the tree diagram.

[2 marks]



Do not write outside the box

14 (b) 40% of people who fail **at least** one section take the test again.

5000 people take the test.

How many of these 5000 people are expected to take the test again?

[4 marks]

Answer _____

Turn over for the next question

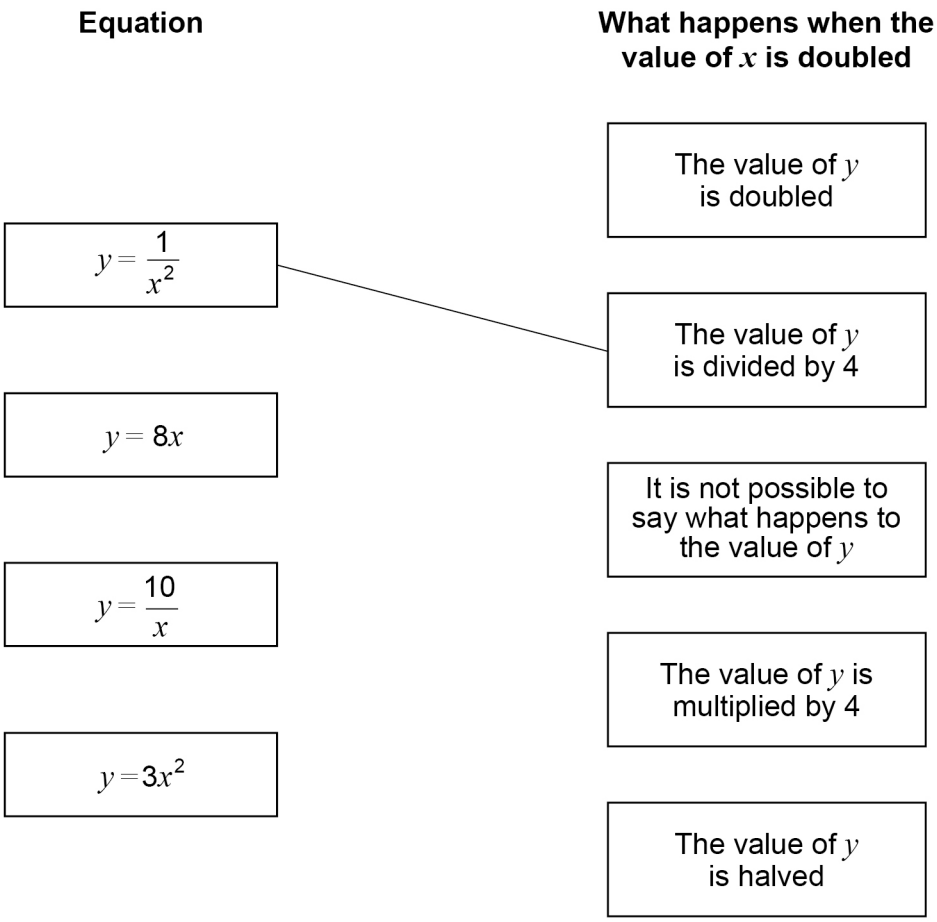
6

Do not write outside the box

15 Match each equation to a statement to show what happens when the value of x is doubled.

One has been done for you.

[3 marks]



Do not write outside the box

16 Rearrange $y = \sqrt{\left(\frac{x}{2} + 1\right)}$ to make x the subject.

[3 marks]

Answer _____

17 A stone falls vertically from 300 metres above ground.

- The stone falls d metres in t seconds.
- d is directly proportional to the square of t.
- The stone falls 20 metres in the first 2 seconds.

Work out the **total** time taken for the stone to reach the ground.

[4 marks]

Answer _____ seconds

10

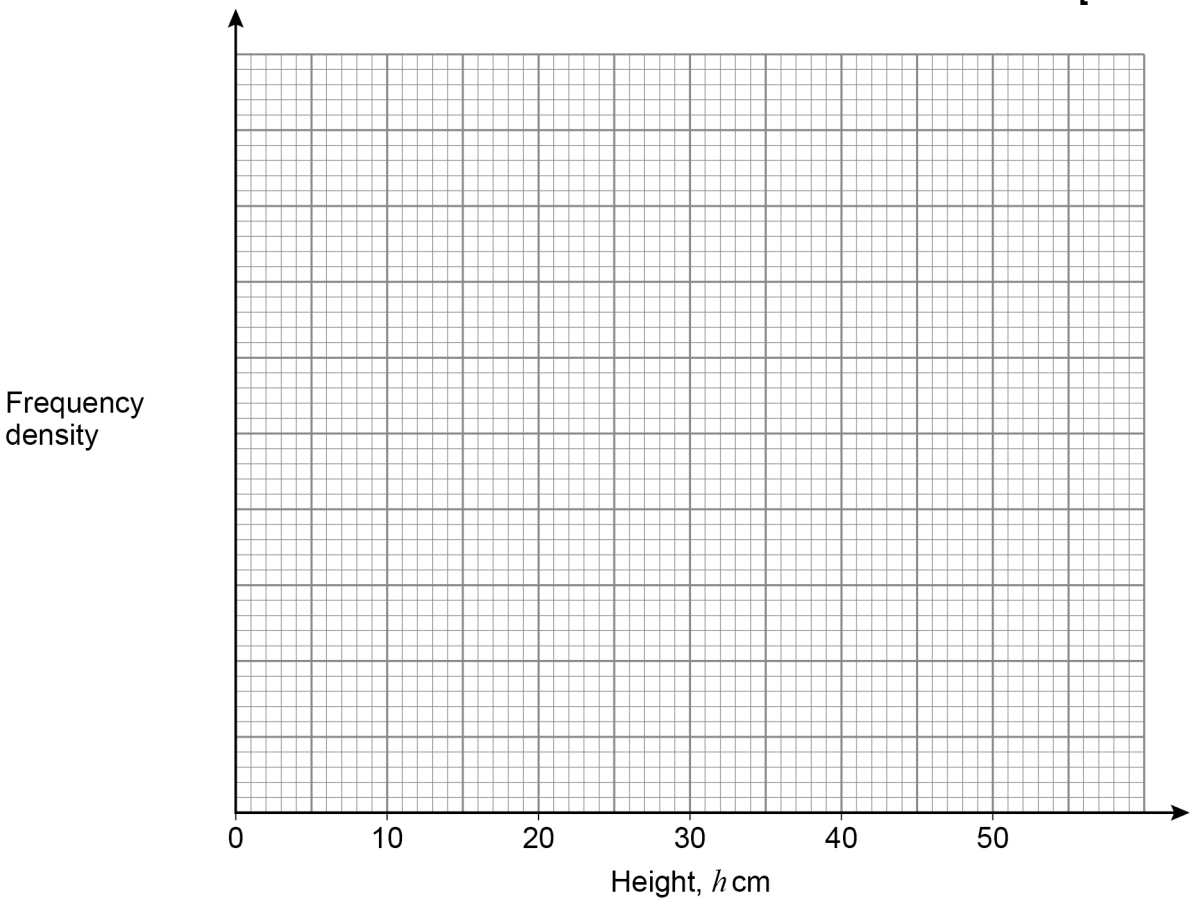
Do not write outside the box

18 The table shows information about the height of 40 plants.

Height, h cm	**Frequency**	**Class width**	
$0 \leqslant h < 5$	6		
$5 \leqslant h < 15$	15		
$15 \leqslant h < 25$	9		
$25 \leqslant h < 50$	10		

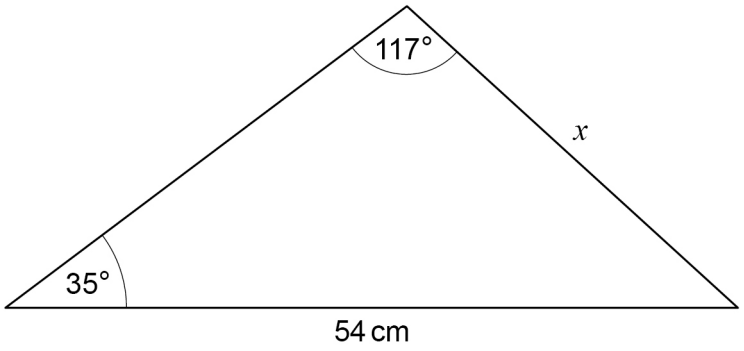
Draw a histogram to represent the heights.

[4 marks]



Do not write outside the box

19



Not drawn accurately

Use the sine rule to work out length x.

You **must** show your working.

[3 marks]

$x =$ _____ cm

20 Factorise fully $3x^2 + 23x + 30$

[2 marks]

Answer _____

9

Turn over ►

Do not write outside the box

21 A bag contains 25 discs.

11 are red, 9 are blue and 5 are yellow.

Ashley picks three of the discs at random without replacement.

Ashley's first disc is red.

Work out the probability that all three discs are different colours.

[3 marks]

Answer _____

Do not write outside the box

22 The metal used to make a sphere costs £4320

The metal costs £3.60 per gram.

Each cubic centimetre of metal has a mass of 17.3 grams.

Work out the radius, r, of the sphere.

Volume of a sphere $= \frac{4}{3}\pi r^3$

[4 marks]

$r =$ _____ cm

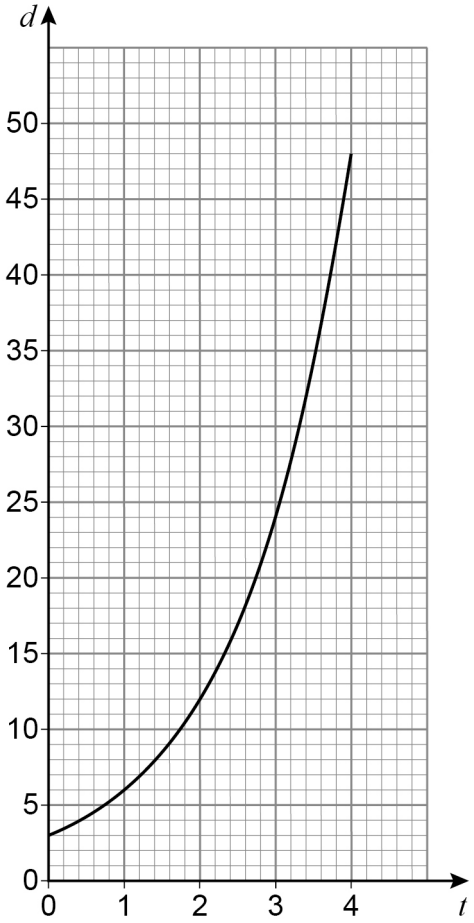
Turn over for the next question

7

Do not write outside the box

23 The distance of a particle from a point is d metres after t seconds.

$d = a \times b^t$ where a and b are constants



Work out the values of a and b.

[3 marks]

$a =$ _____ $b =$ _____

Do not write outside the box

24 A curve has the equation $y = x^2 + 4x - 4$

A straight line has the equation $y = 3x - 2$

Work out the **two** points of intersection of the curve and the straight line.

[5 marks]

Answer (_____ , _____) and (_____ , _____)

END OF QUESTIONS

8

Do not write outside the box

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

Do not write outside the box

Question number	**Additional page, if required.** **Write the question numbers in the left-hand margin.**

Do not write outside the box

Question number	**Additional page, if required.** **Write the question numbers in the left-hand margin.**

Do not write outside the box

Question number	**Additional page, if required.** **Write the question numbers in the left-hand margin.**

Do not write outside the box

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED