AQA

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE MATHEMATICS

F

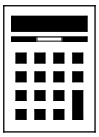
Foundation Tier Paper 3 Calculator

Shadow paper based on June 2023 question paper

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.
- 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	
24	
TOTAL	

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

Do not write outside the box

1 (a) Solve $6y = 42$

[1 mark]

$y =$ _____

1 (b) Solve $h + 8 = 35$

[1 mark]

$h =$ _____

1 (c) Solve $\frac{a}{7} = 9$

[1 mark]

$a =$ _____

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

Do not write outside the box

1 (a) Solve $5x = 15$

[1 mark]

$x =$ _____

1 (b) Solve $y + 7 = 50$

[1 mark]

$y =$ _____

1 (c) Solve $\frac{c}{4} = 8$

[1 mark]

$c =$ _____

Do not write outside the box

2 Here is a list of numbers.

20 18 13 1 13 7 2 5

2 (a) Write down the mode.

[1 mark]

Answer _____

2 (b) Work out the median.

[2 marks]

_____

_____

_____

Answer _____

2 (c) Work out the range.

[1 mark]

_____

Answer _____

Turn over for the next question

7

Do not write outside the box

2 Here is a list of numbers.

10 8 2 11 12 15 4 4

2 (a) Write down the mode.

[1 mark]

Answer _____

2 (b) Work out the median.

[2 marks]

_____

_____

_____

Answer _____

2 (c) Work out the range.

[1 mark]

_____

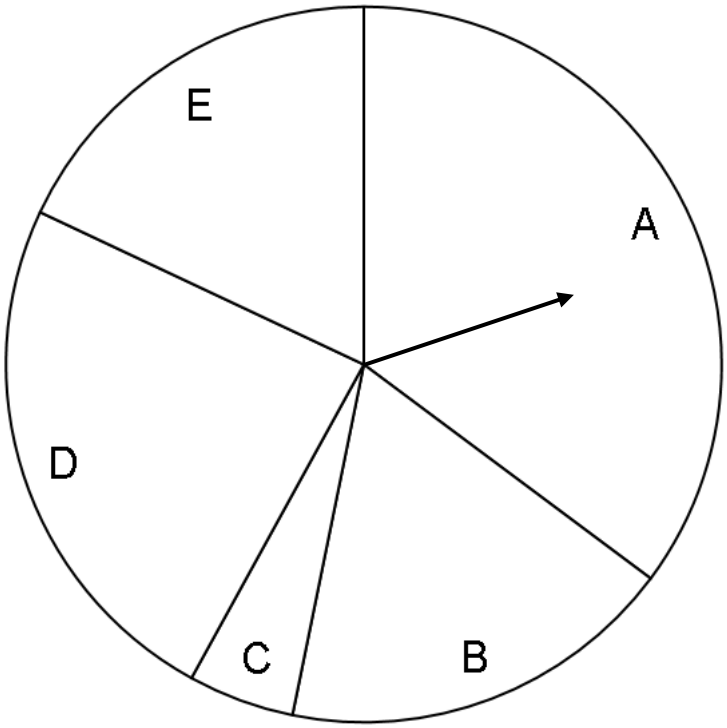
Answer _____

Turn over for the next question

7

Do not write outside the box

3 (a) A fair spinner with five sections is spun.



Complete these statements.

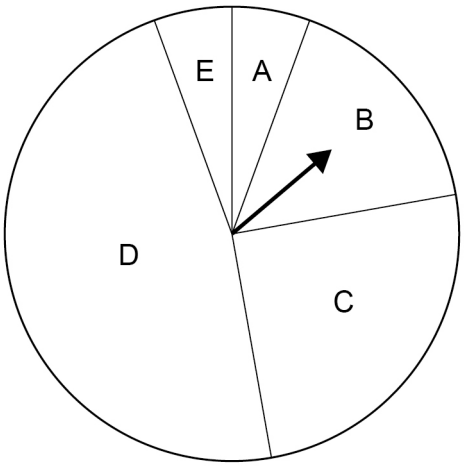
[2 marks]

The spinner is **least likely** to land on section _____

The spinner is **equally likely** to land on sections _____ and _____

Do not write outside the box

3 (a) A fair spinner with five sections is spun.



Complete these statements.

[2 marks]

The spinner is **most likely** to land on section _____

The spinner is **equally likely** to land on sections _____ and _____

Do not write outside the box

3 (b) Two different spinners are spun.

One spinner has sections labelled with colours.

The other spinner has sections labelled with shapes.

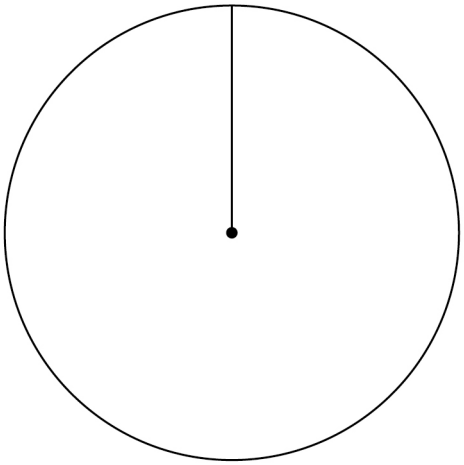
Here is a list of **all** the possible outcomes.

Red Square	Blue Square	Green Square	Yellow Square
Red Circle	Blue Circle	Green Circle	Yellow Circle
Red Triangle	Blue Triangle	Green Triangle	Yellow Triangle

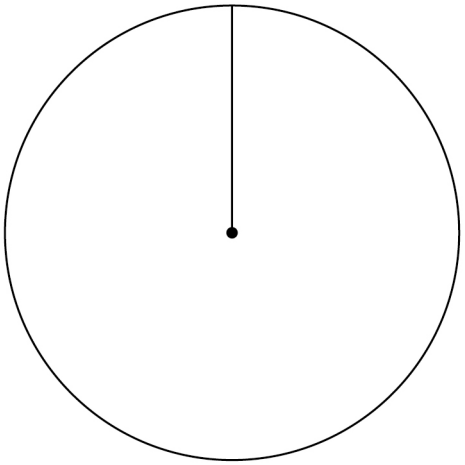
Show the possible sections on the two spinners.

[2 marks]

Colour



Shape



Turn over for the next question

4

Turn over ►

Do not write outside the box

3 (b) Two different spinners are spun.

One spinner has sections labelled with colours.

The other spinner has sections labelled with numbers.

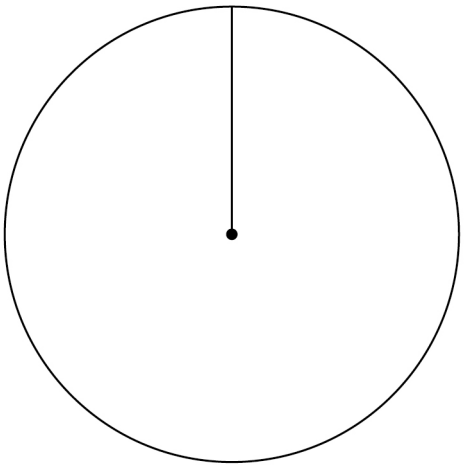
Here is a list of **all** the possible outcomes.

Red 1	Red 2	Red 3	Red 4
Blue 1	Blue 2	Blue 3	Blue 4
Green 1	Green 2	Green 3	Green 4

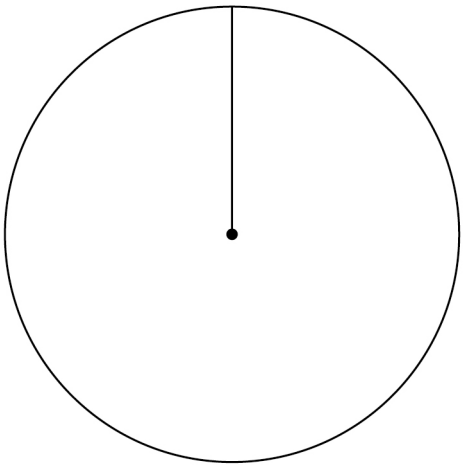
Show the possible sections on the two spinners.

[2 marks]

Colour



Number



Turn over for the next question

4

Do not write outside the box

4 A roll holds 10.5 metres of wallpaper.

3 pieces of wallpaper are cut from the roll.

Each piece is 80 centimetres long.

What length of wallpaper is left on the roll?

State the units of your answer.

[3 marks]

Answer _____

Do not write outside the box

4 A reel holds 9.5 metres of ribbon.

2 pieces of ribbon are cut from the reel.

Each piece is 20 centimetres long.

What length of ribbon is left on the reel?

State the units of your answer.

[3 marks]

Answer _____

Do not write outside the box

5 (a) The term-to-term rule for a sequence is

add 3 then multiply by 4

The 1st term is 1

Work out the 3rd term.

[2 marks]

Answer _____

5 (b) The term-to-term rule for a different sequence is

subtract 45 then divide by 5

The 2nd term is 30

Work out the 1st term.

[2 marks]

Answer _____

Turn over for the next question

7

Do not write outside the box

5 (a) The term-to-term rule for a sequence is

subtract 1 then multiply by 5

The 1st term is 4

Work out the 3rd term.

[2 marks]

Answer _____

5 (b) The term-to-term rule for a different sequence is

add 20 then divide by 2

The 2nd term is 50

Work out the 1st term.

[2 marks]

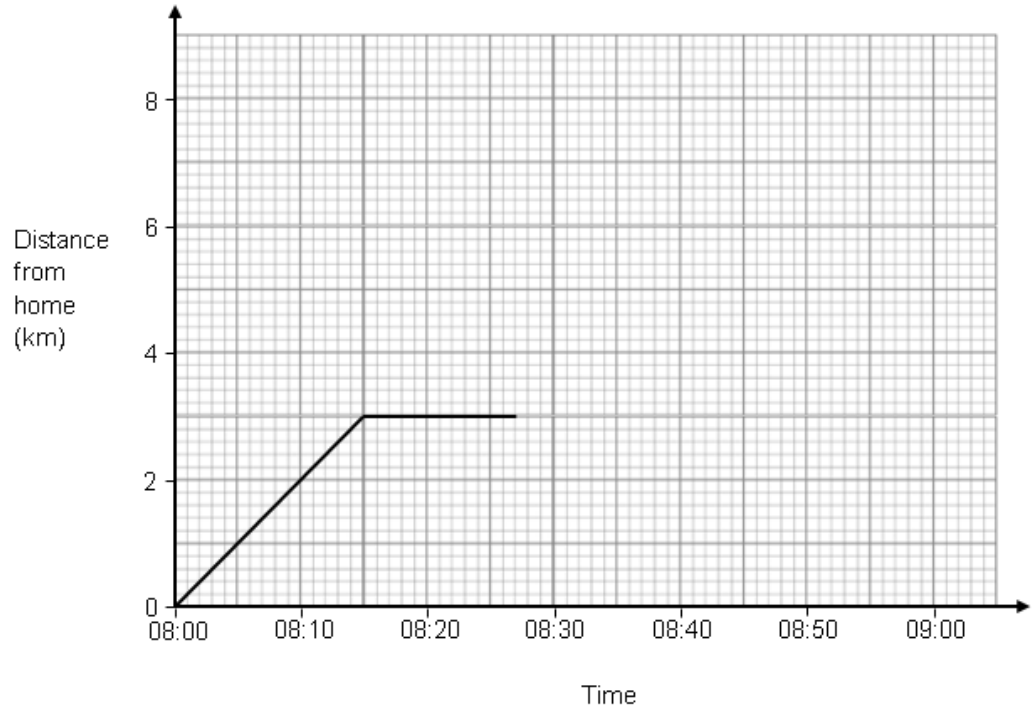
Answer _____

7

Do not write outside the box

6 Ronnie leaves home at 08.00 to cycle to a friend's house.

Here is part of a distance-time graph of his trip.



6 (a) He arrives at the friend's house at 8:15

How far is Ronnie's friend's house from his home?

[1 mark]

Answer _____ km

6 (b) Ronnie leaves his friend's house at 8.27

How long does he stay at his friend's?

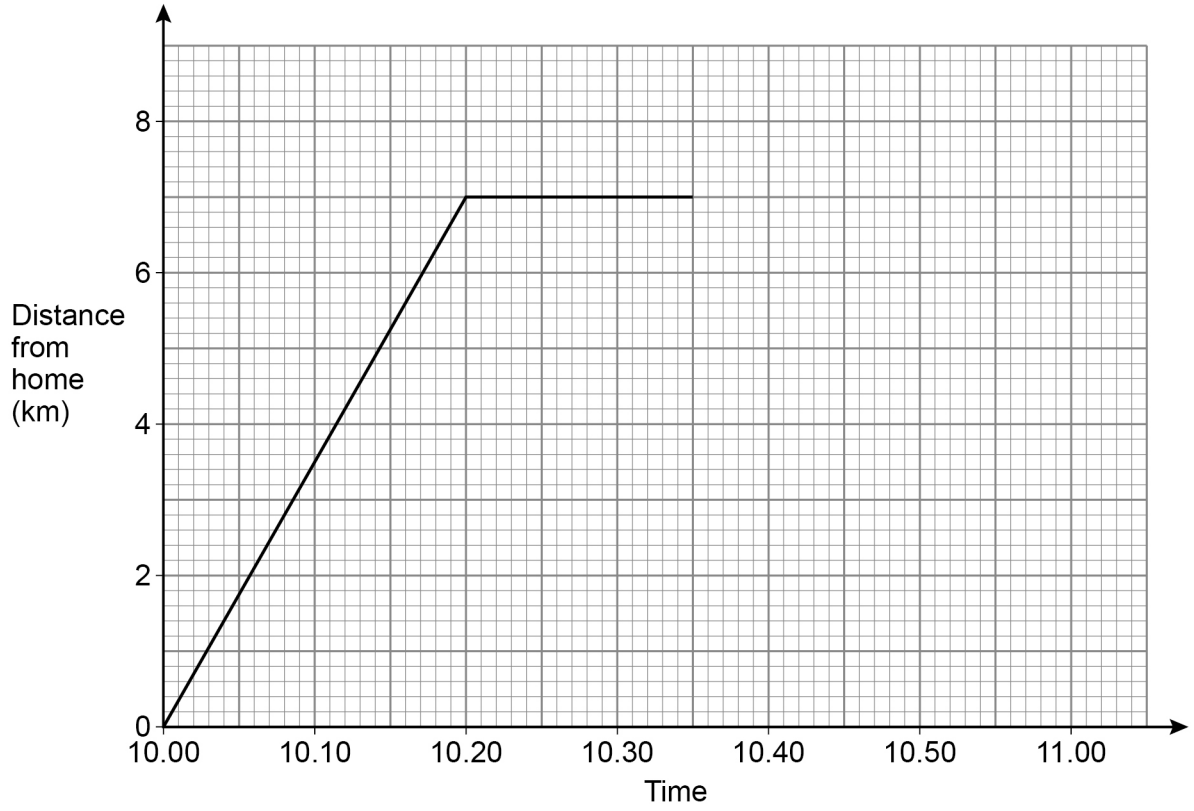
[1 mark]

Answer _____ minutes

Do not write outside the box

6 Scarlett leaves home at 10.00 to cycle to the supermarket.

Here is part of a distance-time graph of her trip to the supermarket.



6 (a) She arrives at the supermarket at 10.20

How far is the supermarket from her home?

[1 mark]

Answer _____ km

6 (b) She leaves the supermarket at 10.35

How long does she stay at the supermarket?

[1 mark]

Answer _____ minutes

Do not write outside the box

6 (c) Ronnie cycles home at a constant speed using the same route.
It takes him 6 minutes longer than his journey to his friend's house.

Complete the distance-time graph.

[2 marks]

7 This week, Anisha works

24 hours at £10.40 per hour

and

extra hours at the weekend at £15.60 per hour.

Here are the extra hours she works at the weekend.

Saturday	6 am to 10 am
Sunday	2 pm to 8 pm

In **total**, how much is she paid this week?

[4 marks]

Answer £ _____

8

Turn over ►

Do not write outside the box

6 (c) Scarlett cycles home at a constant speed using the same route.
It takes her 3 minutes longer than her journey to the supermarket.

Complete the distance-time graph.

[2 marks]

7 This week, Liam works

25 hours at £10.20 per hour

and

extra hours at the weekend at £11.80 per hour.

Here are the extra hours he works at the weekend.

Saturday	7 am to 10 am
Sunday	1 pm to 3 pm

In **total**, how much is he paid this week?

[4 marks]

Answer £ _____

8

Do not write outside the box

8 Three plums have masses of 40 g, 40 g and 35 g

Show that their **total** mass is between $\frac{1}{10}$ and $\frac{1}{8}$ of a kilogram.

[3 marks]

9 For each statement, tick the correct box.

[3 marks]

	Always true	**Sometimes true**	**Never true**
At least one of the three angles in a triangle has to be acute.	☐	☐	☐
All three angles in a triangle are the same size.	☐	☐	☐
One of the three angles of a triangle is obtuse.	☐	☐	☐

Do not write outside the box

8 Three oranges have masses of 60 g, 70 g and 85 g

Show that their **total** mass is between $\frac{1}{5}$ and $\frac{1}{4}$ of a kilogram.

[3 marks]

9 For each statement, tick the correct box.

[3 marks]

	Always true	**Sometimes true**	**Never true**
One of the three angles of a triangle is 90°	☐	☐	☐
One of the three angles of a triangle is obtuse	☐	☐	☐
One of the three angles of a triangle is reflex	☐	☐	☐

Do not write outside the box

10 (a) Simplify fully $m^5 \times m^3$

[1 mark]

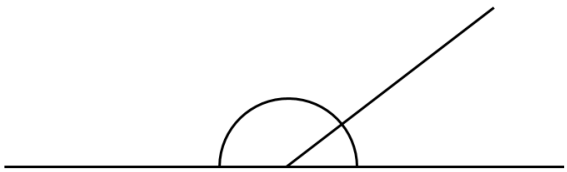
Answer _____

10 (b) Simplify fully $8h + 9g - 2h + 5g$

[2 marks]

Answer _____

11 Two angles on a straight line are shown.



Not drawn accurately

The angles are in the ratio 4 : 11

Show that the smaller angle is 48°

[2 marks]

11

Turn over ►

Do not write outside the box

10 (a) Simplify fully $p^2 \times p$

[1 mark]

Answer _____

10 (b) Simplify fully $3a + 5c - a + 6c$

[2 marks]

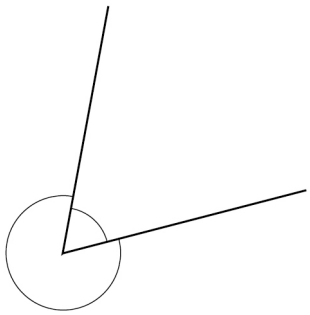
Answer _____

Turn over for the next question

9

Do not write outside the box

11 Two angles around a point are shown.



Not drawn accurately

The angles are in the ratio 2 : 7

Show that the larger angle is 280°

[2 marks]

Do not write outside the box

12 (a) $a > 7$ $b < 3$ $a - b = 10$

Work out a possible pair of values for a and b.

[2 marks]

$a =$ _____ $b =$ _____

12 (b) w is greater than 4 **and** less than 5

x is greater than 1 **and** less than 2

$w + x = 6.5$

Work out a possible pair of values for w and x.

[2 marks]

$w =$ _____ $x =$ _____

Do not write outside the box

12 (a) $c > 4$ $d < 4$ $c - d = 6$

Work out a possible pair of values for c and d.

[2 marks]

$c =$ _____ $d =$ _____

12 (b) w is greater than 1 **and** less than 2

x is greater than 0 **and** less than 1

$w + x = 2.6$

Work out a possible pair of values for w and x.

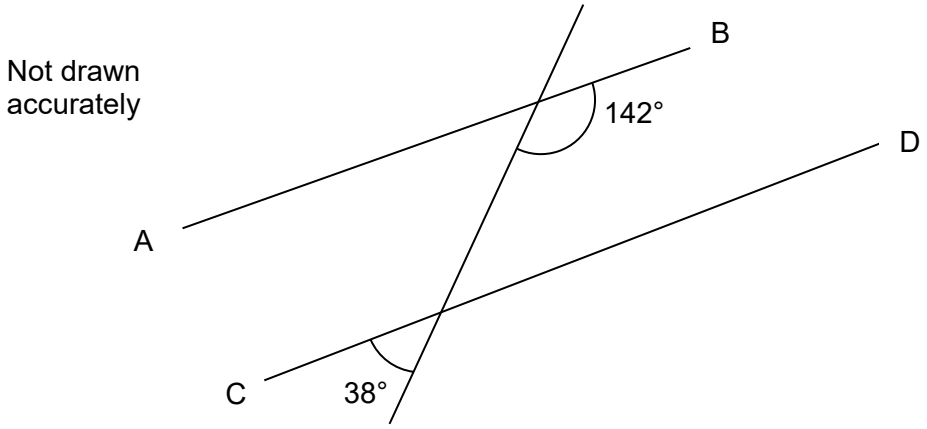
[2 marks]

$w =$ _____ $x =$ _____

6

Do not write outside the box

13 Here are three straight lines.



Are the lines *AB* and *CD* parallel?

Tick a box.

Yes ☐ No ☐

Show working to support your answer.

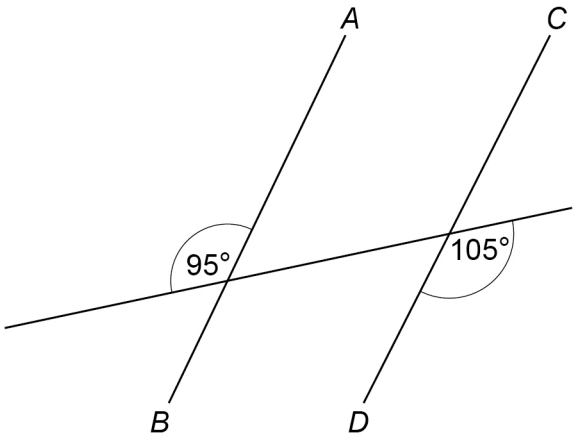
[2 marks]

Turn over for the next question

6

Do not write outside the box

13 Here are three straight lines.



Not drawn accurately

Are the lines *AB* and *CD* parallel?

Tick a box.

Yes ☐ No ☐

Show working to support your answer.

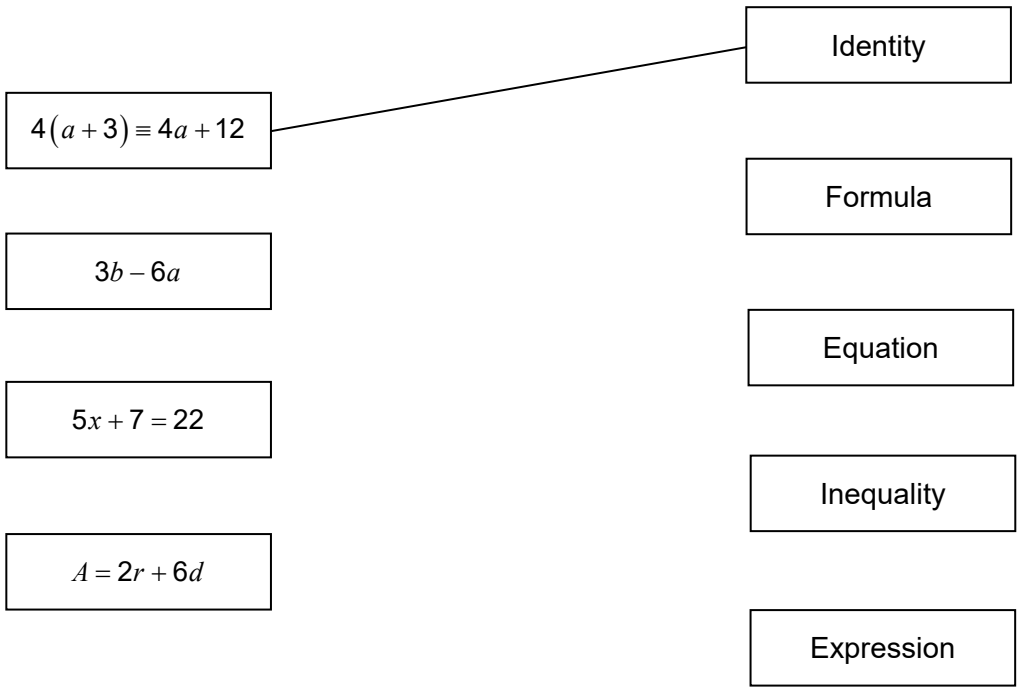
[2 marks]

Do not write outside the box

14 Match the algebra to the correct description.

One has been done for you.

[3 marks]

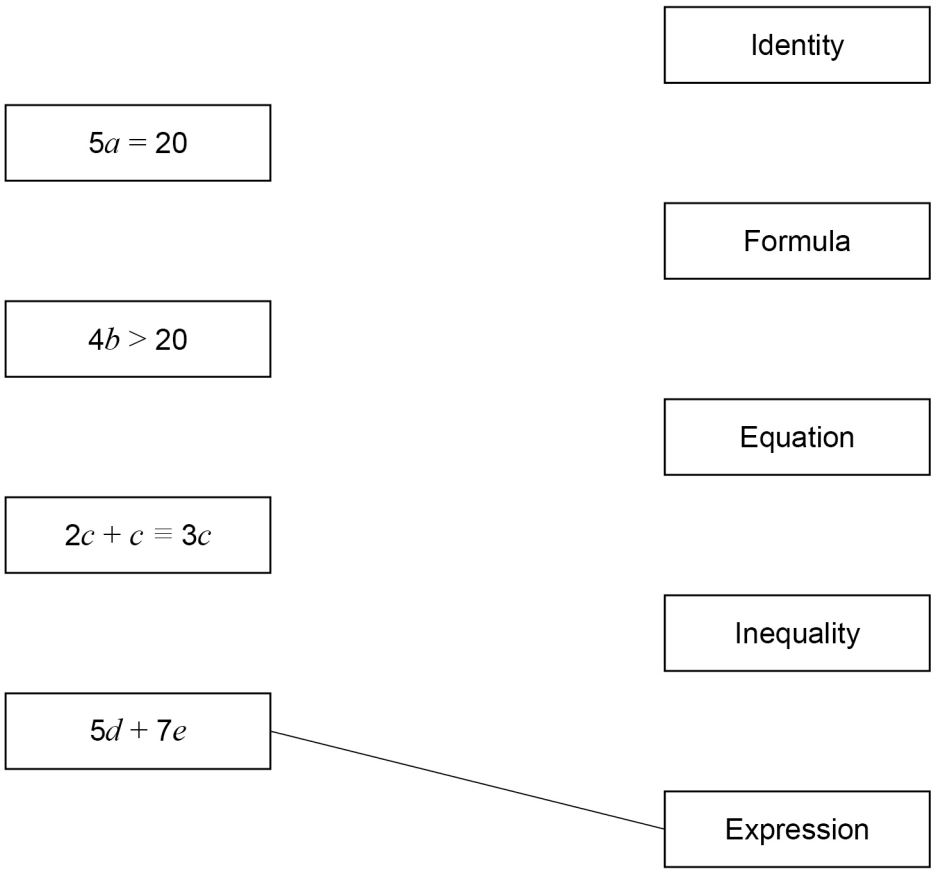


Do not write outside the box

14 Match the algebra to the correct description.

One has been done for you.

[3 marks]



Turn over for the next question

5

Do not write outside the box

15 Potatoes are sold in bags.

2 large bags have a total mass of 650 g

4 small bags and 3 large bags have a total mass of 1975 g

Work out the mass of a small bag.

[4 marks]

Answer _____ g

Turn over for the next question

7

Do not write outside the box

15 Popcorn is sold in bags.

8 small bags have a total mass of 496 g

5 small bags and 2 large bags have a total mass of 638 g

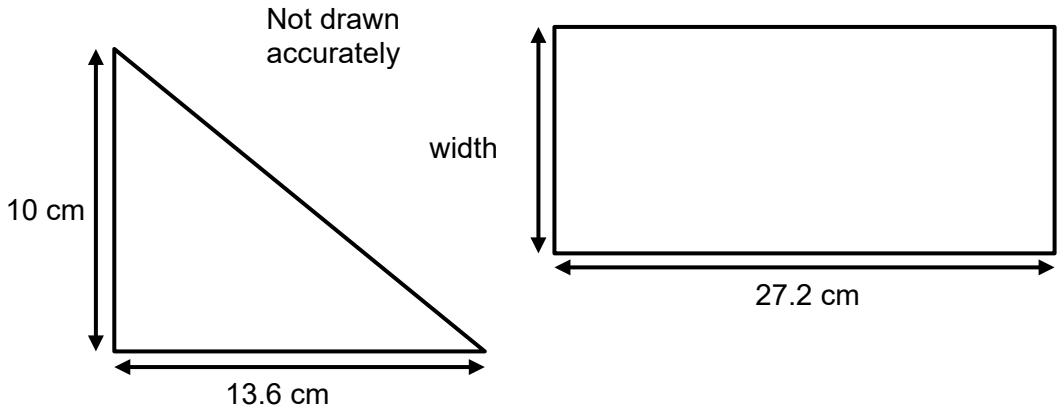
Work out the mass of a large bag.

[4 marks]

Answer _____ g

Do not write outside the box

16 The square and the triangle have the same area.



Work out the width of the rectangle.

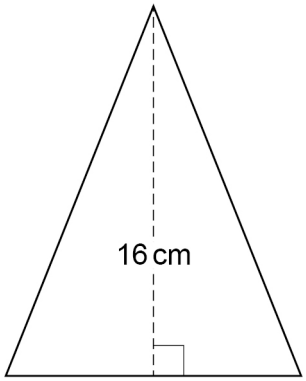
[3 marks]

Answer _____ cm

Do not write outside the box

16 The rectangle and the triangle have the same area.

Not drawn accurately



Work out the length of the rectangle.

[3 marks]

Answer _____ cm

Turn over for the next question

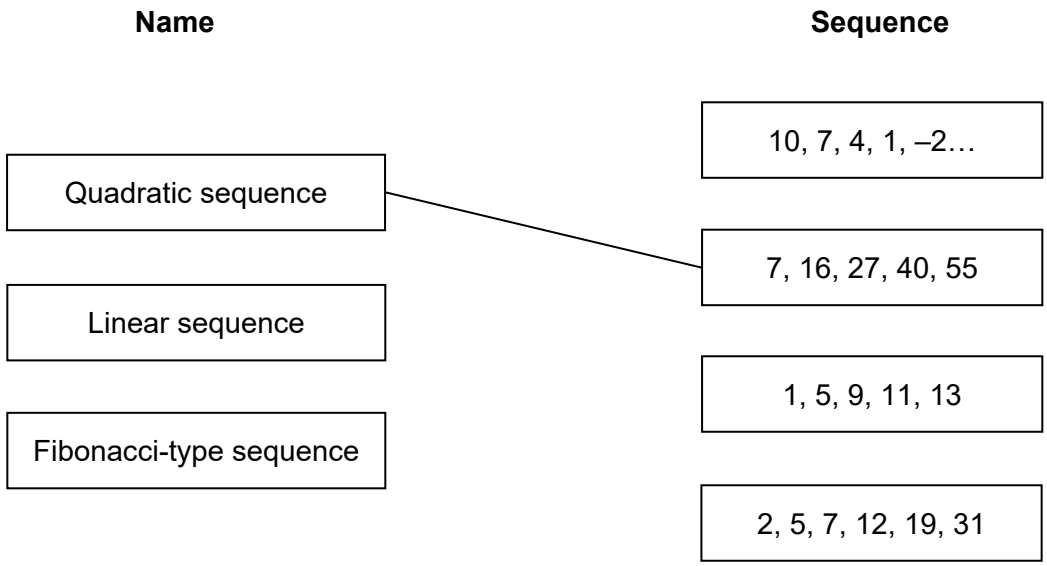
7

Do not write outside the box

17 Match the name to the correct sequence.

One has been done for you.

[2 marks]



18 The number of foxes in England is expected to **increase** by 2% each year.

Assume there are now 357 000 foxes in England.

Work out the expected number of foxes in England after **six** years.

You **must** show your working.

[3 marks]

Answer _____

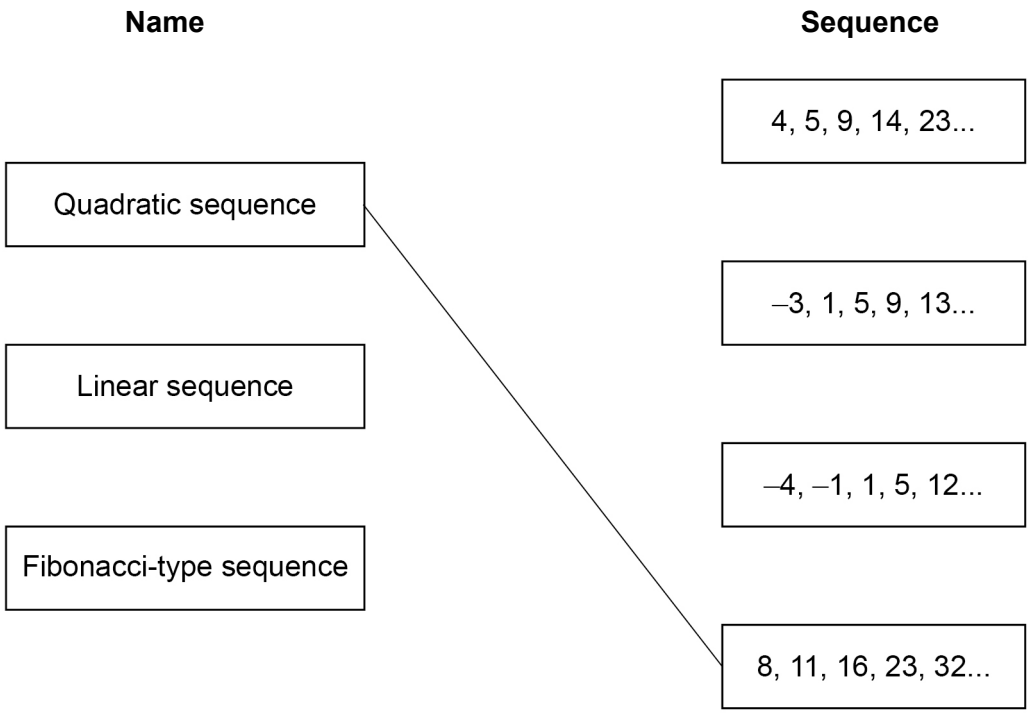
8

Do not write outside the box

17 Match the name to the correct sequence.

One has been done for you.

[2 marks]



18 The number of hedgehogs in England is expected to **reduce** by 4% each year.

Assume there are now 1 000 000 hedgehogs in England.

Work out the expected number of hedgehogs in England after **five** years.

You **must** show your working.

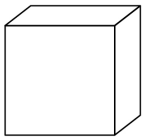
[3 marks]

Answer _____

Do not write outside the box

19 Here is a cube A.

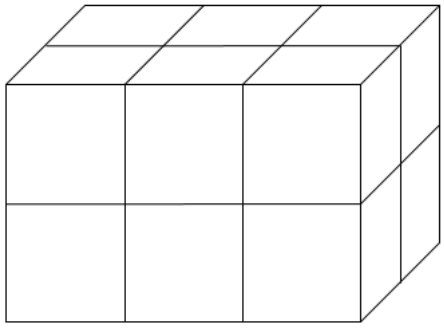
A



Not drawn accurately

Cuboid B is made from **twelve** of cube A.

B



volume of A : volume of B = 1 : 12

Henry says,

"surface area of A : surface area of B must be 1 : 12 because cuboid B is made of 12 of A."

Is Henry correct?

Tick **one** box.

☐ Yes ☐ No ☐ Cannot tell

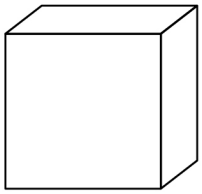
Give a reason for your answer.

[2 marks]

Do not write outside the box

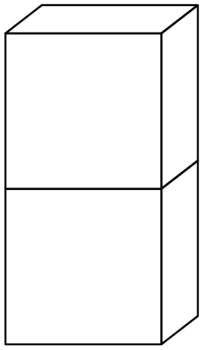
19 Here is cuboid A.

A



Cuboid B is made from **two** of cuboid A.

B



volume of A : volume of B = 1 : 2

Matthew says,

"surface area of A : surface area of B must be 1 : 2 because B is made of 2 of A."

Is Matthew correct?

Tick **one** box.

☐ Yes ☐ No ☐ Cannot tell

Give a reason for your answer.

[2 marks]

7

Turn over ►

Do not write outside the box

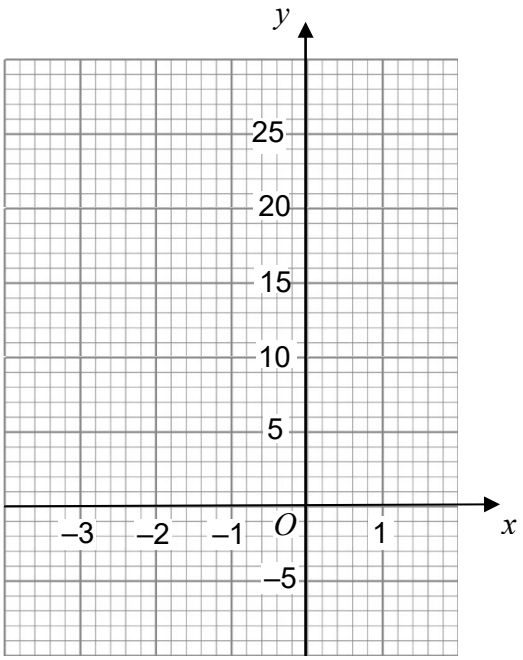
20 (a) Complete the table of values for $y = x^2 - 4x$

[2 marks]

x	–3	–2	–1	0	1
y	21		5	0	

20 (b) Draw the graph of $y = x^2 - 4x$ for values of x from –3 to 1

[2 marks]



Turn over for the next question

6

Do not write outside the box

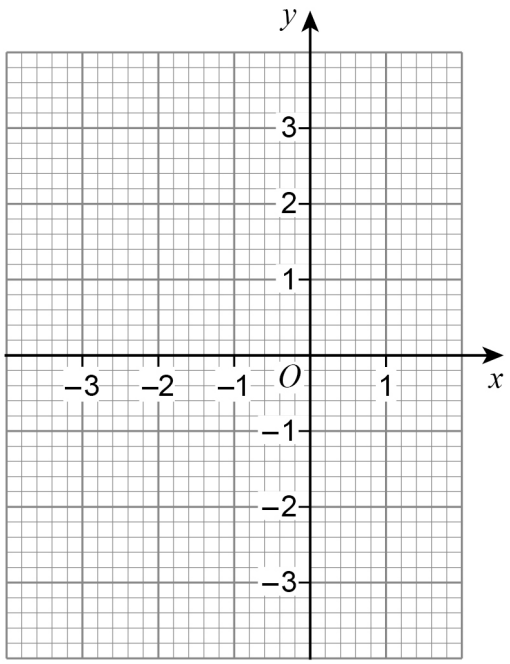
20 (a) Complete the table of values for $y = x^2 + 2x$

[2 marks]

x	–3	–2	–1	0	1
y	3		–1	0	

20 (b) Draw the graph of $y = x^2 + 2x$ for values of x from –3 to 1

[2 marks]



Do not write outside the box

21 Shirley has £5625

She saves some and donates the rest to charity.

money saved : money given to charity = 2 : 7

She gives each of **five** charities the **same** amount.

Does each charity receive more than £870 ?

You **must** show your working.

[4 marks]

Do not write outside the box

21 Jing has £2450

She saves some and gives the rest to her four brothers.

money saved : money given to brothers = 2 : 5

She gives each of her **four** brothers the **same** amount.

Does each brother receive more than £430 ?

You **must** show your working.

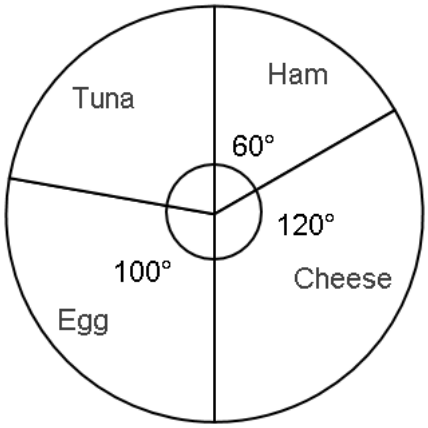
[4 marks]

Turn over for the next question

8

Do not write outside the box

22 The pie chart shows information about customers choice of sandwich filling.



Not drawn accurately

12 **more** customers chose egg than chose ham.

Work out the number of customers who chose tuna.

[3 marks]

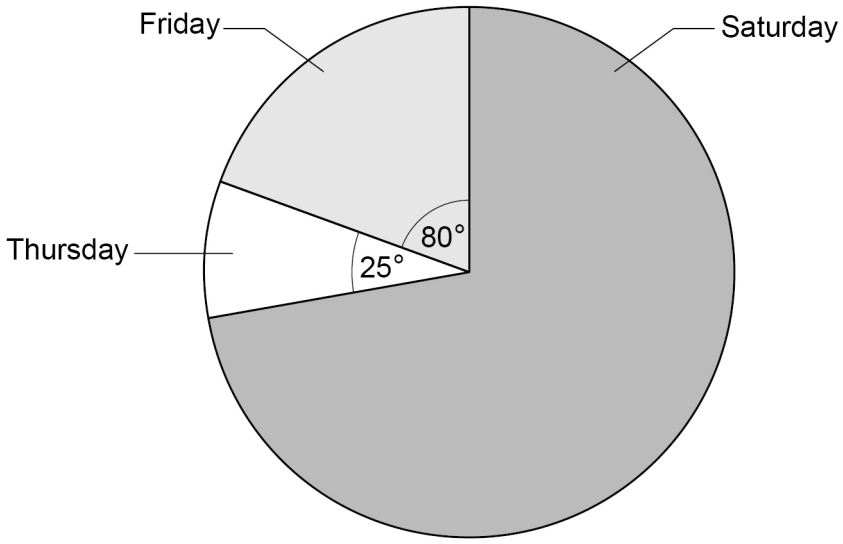
Answer _____

Turn over for the next question

7

22 The pie chart shows information about people at a fair during three days.

Not drawn accurately



There were 132 **more** people on Friday than on Thursday.

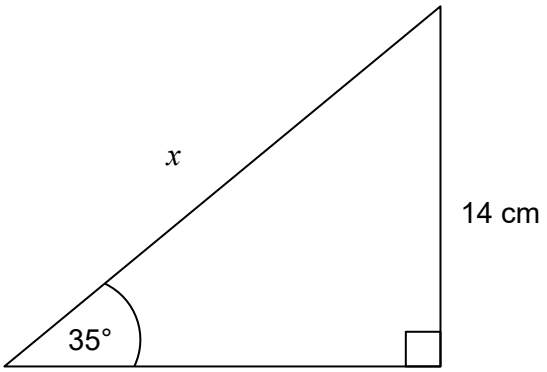
Work out the number of people on Saturday.

[3 marks]

Answer _____

Do not write outside the box

23 Use trigonometry to work out the value of x.



Not drawn accurately

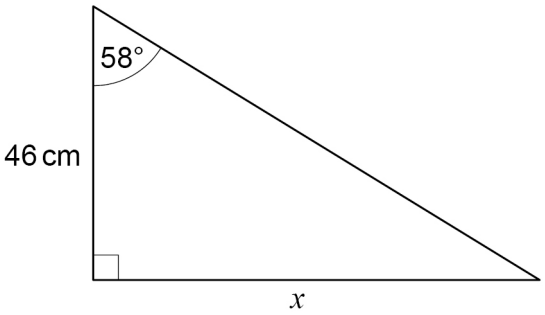
[3 marks]

$x =$ _____ cm

Do not write outside the box

23 Use trigonometry to work out the value of x.

Not drawn accurately



[3 marks]

$x =$ _____ cm

Turn over for the next question

6

Do not write outside the box

24 Aiza is estimating the value of $\dfrac{2}{\left(\sqrt{4.36}\right)^3 \times 5.49}$

She rounds each decimal number to 1 significant figure.

24 (a) Work out Aiza's estimate.

You **must** show your working.

[2 marks]

Answer _____

24 (b) Aiza says,

"My estimate must be larger than the exact value."

Without working out the exact value, give a reason how she can know this.

[1 mark]

Turn over for the next question

6

Do not write outside the box

24 Millie is estimating the value of $\dfrac{1}{\left(\sqrt[3]{8.34}\right)^2 \times 10.21}$

She rounds each decimal number to 1 significant figure.

24 (a) Work out Millie's estimate.

You **must** show your working.

[2 marks]

Answer _____

24 (b) Millie says,

"My estimate must be more than the exact value."

Without working out the exact value, give a reason how she can know this.

[1 mark]

Do not write outside the box

25 (a) Factorise $x^2 + 4x - 21$

[2 marks]

Answer _____

25 (b) Write down the **two** solutions of $(y - 9)(y - 2) = 0$

[1 mark]

Answer _____

END OF QUESTIONS

3

Do not write outside the box

25 (a) Factorise $x^2 + 8x + 15$

[2 marks]

Answer _____

25 (b) Write down the **two** solutions of $(y + 2)(y - 4) = 0$

[1 mark]

Answer _____

END OF QUESTIONS

6