Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____
I declare this is my own work.

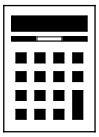
GCSE
MATHEMATICS

F

Foundation Tier Paper 2 Calculator

Wednesday 7 June 2023 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.

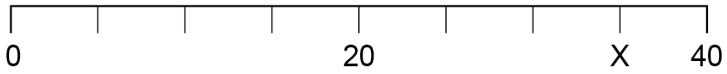
Advice
In all calculations, show clearly how you work out your answer.

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	
24–25	
TOTAL	

Do not write outside the box

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

1 (a) Here is a number line.

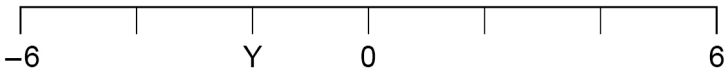


What number is at X?

[1 mark]

Answer _____

1 (b) Here is a different number line.



What number is at Y?

[1 mark]

Answer _____

Do not write outside the box

2 Match each expression on the left with the simplified expression on the right.

One has been done for you.

[4 marks]

$3a + 4a$	$12a$
$14a - 2a$	$7a$
$3a \times 3a$	$3a$
$6 \times 3a$	$18a$
$12a \div 4$	$9a^2$
	$6a$

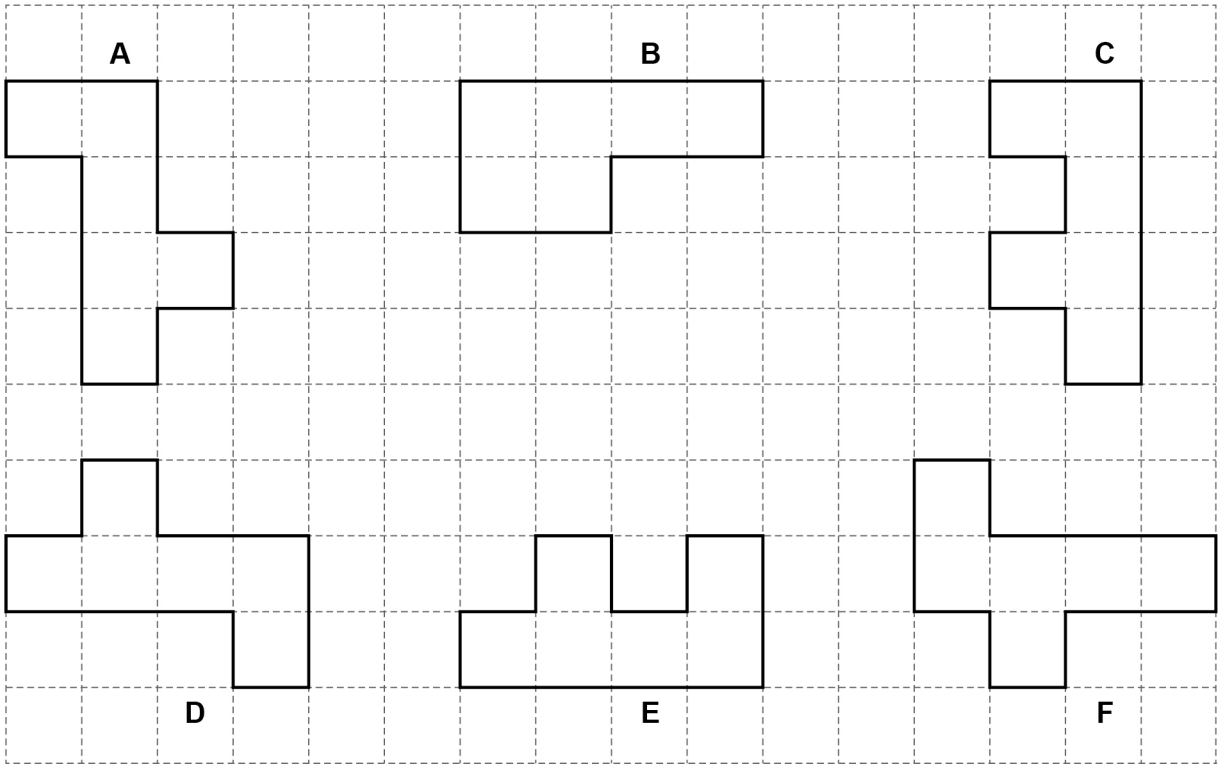
Turn over for the next question

6

Do not write outside the box

3 Here are some shapes.

Each shape has an area of six square centimetres.



3 (a) Which has the bigger perimeter, shape **A** or shape **B**?

You **must** show the lengths of both perimeters.

[2 marks]

Answer _____

3 (b) Which shape is congruent to shape **A**?

[1 mark]

Answer _____

Do not write outside the box

3 (c) Which **two** shapes fit together to make a rectangle?

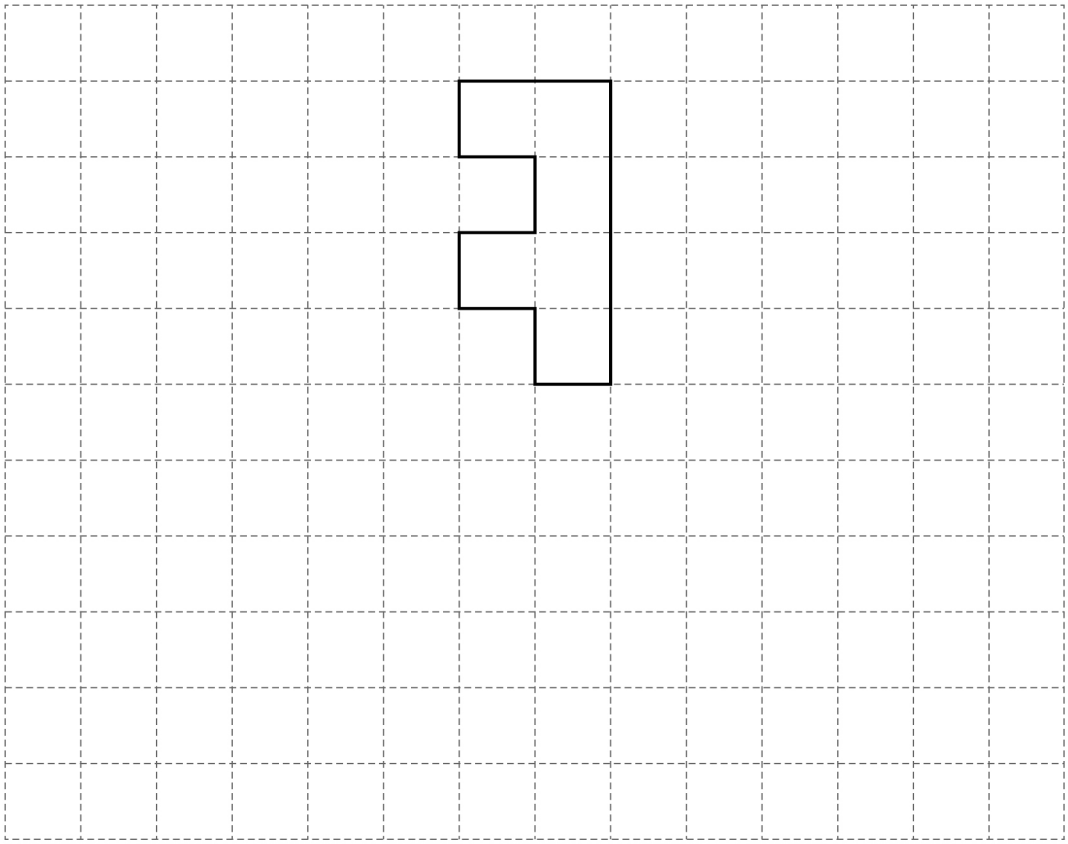
[1 mark]

Answer _____ and _____

3 (d) On this grid draw a reflection of shape **C**.

Show your mirror line.

[2 marks]

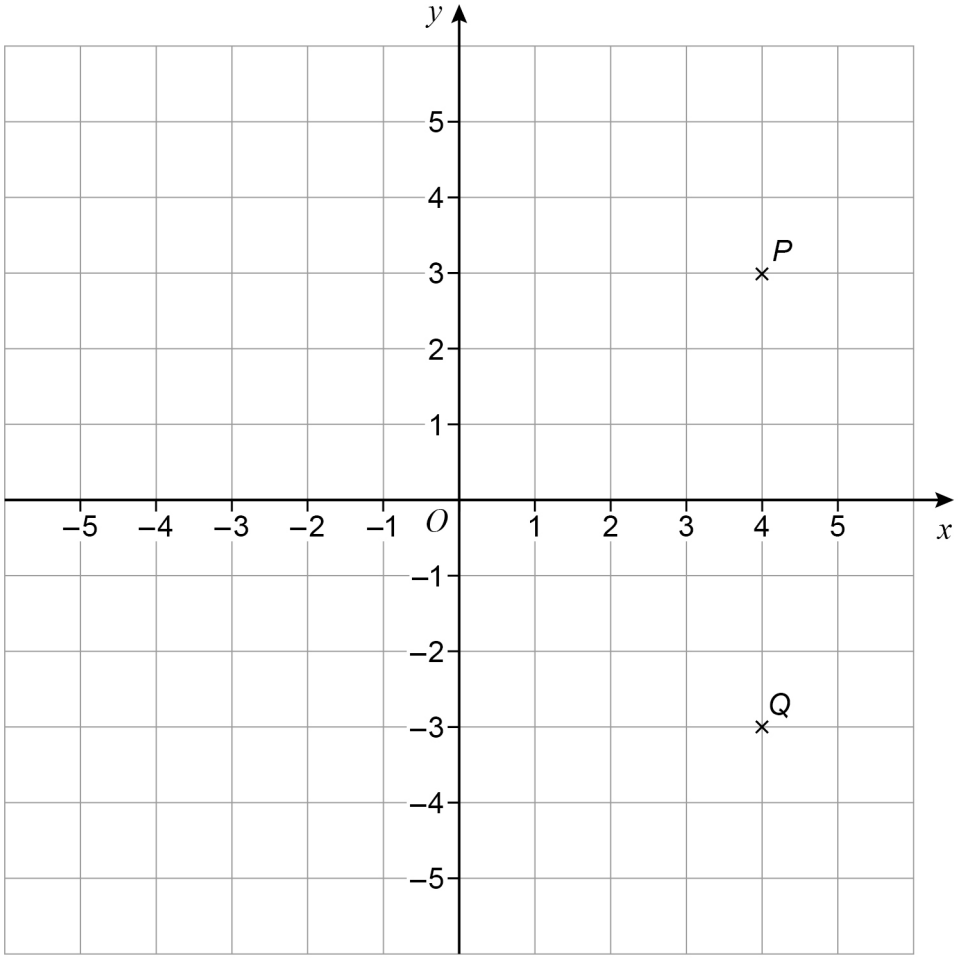


Turn over for the next question

6

Do not write outside the box

4 Points *P* and *Q* are shown on the grid.



4 (a) Write down the coordinates of *P*.

[1 mark]

Answer (_____ , _____)

4 (b) Angle *PQR* is a right angle.

Work out possible coordinates for *R*.

[1 mark]

Answer (_____ , _____)

Do not write outside the box

5 (a) A shop sells bottles of orange juice.

Each bottle costs 75p

Work out the greatest number of bottles that can be bought with £5

[2 marks]

Answer _____

5 (b) Two shops sell bottles of apple juice.

Shop X	**Shop Z**
pack of 4 bottles Was £2.50 Now 10% off	pack of 12 bottles £7

At which shop is it cheaper to buy 24 bottles?

Show working to support your answer.

[4 marks]

Answer _____

8

Do not write outside the box

6 A game has four cards labelled A, B, C and D.

Ellie picks two of the cards at random.

Complete the list of the **six** possible pairs of cards she could pick.

[2 marks]

AB

7 (a) Complete the boxes using

two **different** even numbers

and

two **different** odd numbers.

[2 marks]

$\square + \square + \square + \square = 46$

Do not write outside the box

7 (b) Complete the boxes using

a factor of 12

and

a factor of 40

[2 marks]

$\square \times \square = 30$

7 (c) Complete the boxes using

a square number

and

a prime number.

[2 marks]

$\square \div \square = 18$

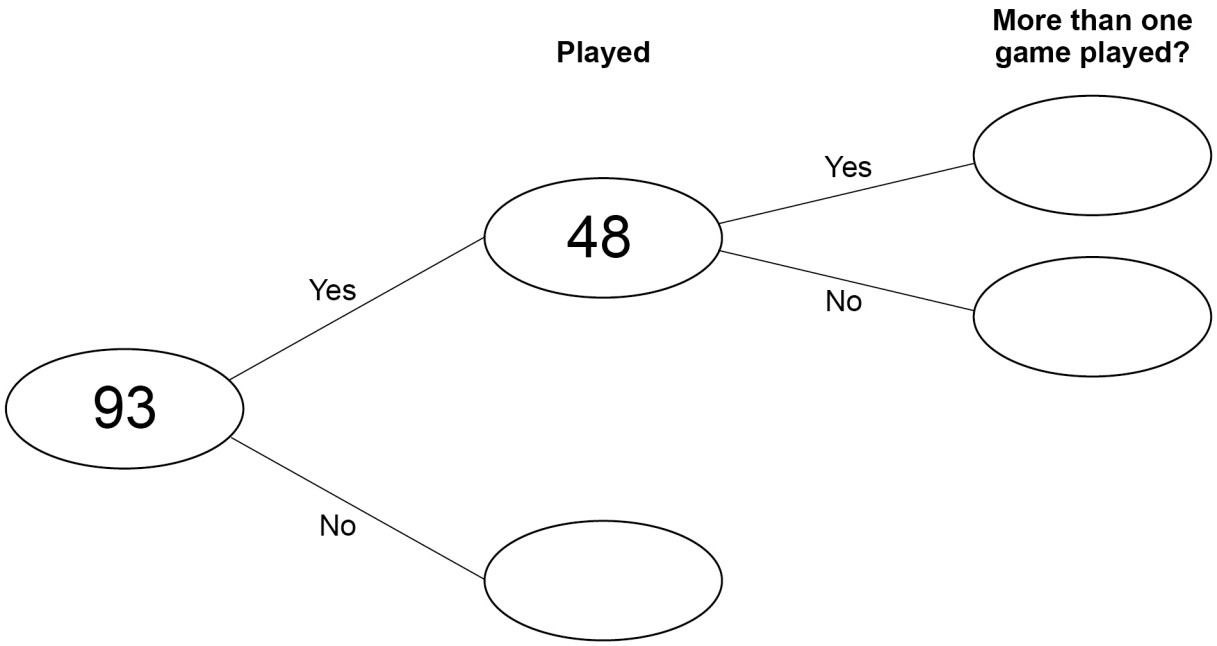
Turn over for the next question

8

Do not write outside the box

8 93 people were asked if they played online games one day.

The frequency tree shows some information about their answers.



8 (a) 75% of the people who answered Yes played one game.

Complete the frequency tree.

[3 marks]

Do not write outside the box

8 (b) One of the 93 people is chosen at random.

P(used social media) is **more than** 0.68

What is the **smallest** possible number of people who used social media?

[2 marks]

Answer _____

Turn over for the next question

5

Do not write outside the box

9 (a) The cost of a TV streaming service is

£6 per month for the first 4 months

then

£11 per month for the rest of the year.

Work out the **total** cost for the year.

[2 marks]

Answer £ _____

9 (b) A TV series has ten episodes.

Nine episodes are each 50 minutes long.

One episode is 1 hour 42 minutes long.

Work out the **total** length of the series.

Give your answer in hours and minutes.

[3 marks]

Answer _____ hours _____ minutes

Do not write outside the box

10 (a) There are 1020 books in a box.

$\frac{2}{5}$ of the books are blue.

How many are blue?

[2 marks]

Answer _____

10 (b) There are green pens and red pens in the box.

The ratio of green : red is 4 : 3

What fraction of the pens are green?

[1 mark]

Answer _____

10 (c) There are some calculators in the box.

220 are scientific.

30 are not.

What percentage of the calculators are scientific?

[2 marks]

Answer _____ %

10

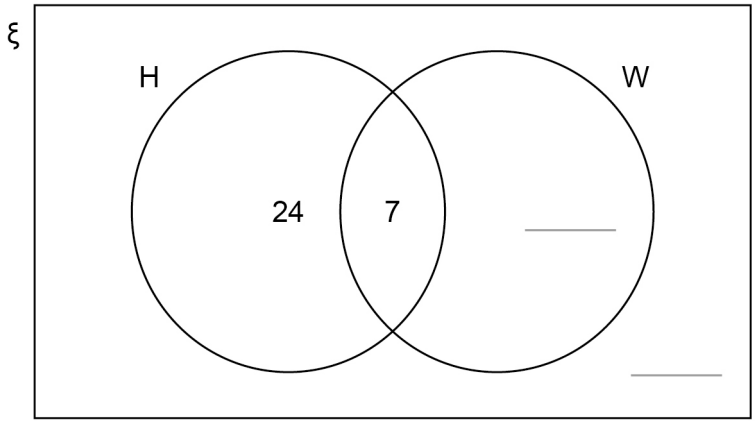
Do not write outside the box

11 Here is a Venn diagram.

ξ = 60 people

H = people who own a gaming headset

W = people who own a smart watch



11 (a) 15 of the people own a smart watch.

Complete the Venn diagram.

[2 marks]

11 (b) One of the 60 people is chosen at random.

What is the probability that they own **both** a gaming headset and a smart watch?

[1 mark]

Answer _____

Do not write outside the box

11 (c) Marek is going to buy a gaming headset that costs £35

He already has £19

He plans to save the rest in two equal amounts over the next two weeks.

He uses this method to work out in pounds how much to save each week.

$$35 - 19 \div 2$$

What is wrong with his method?

[1 mark]

Turn over for the next question

4

Do not write outside the box

12 Kai says that 3 : 2 is an equivalent ratio to 9 : 6

Jo says that 1.5 : 1 is an equivalent ratio to 9 : 6

Who is correct?

Tick **one** box.

☐ Both of them

☐ Kai only

☐ Jo only

☐ Neither of them

Give reasons for your answer.

[2 marks]

Do not write outside the box

13 28 is increased by 25%

40 is decreased by 15%

Which answer is bigger?

Show how you decide.

[4 marks]

Answer _____

Turn over for the next question

6

Do not write outside the box

14 Factorise $12a + 15b$

[1 mark]

Answer _____

15 Write down all the integers that satisfy the inequality

$$-3 \leqslant x < 2$$

[2 marks]

Answer _____

16 A linear sequence starts

7 10 13 16

Work out an expression for the nth term of the sequence.

[2 marks]

Answer _____

Do not write outside the box

17 Jess saves 2p, 5p and 10p coins.

She has

- 45 10p coins
- 8 times as many 2p coins as **10p coins**
- £17.70 in total.

Work out total **value** of 2p coins : total **value** of 5p coins

Give your answer in its simplest form.

[4 marks]

Answer _____ : _____

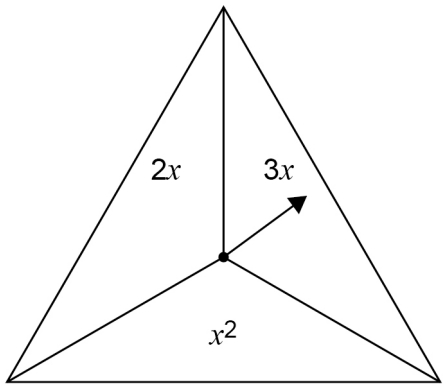
9

Turn over ►

Do not write outside the box

18 In a game,

- an ordinary fair six-sided dice is rolled
- the fair spinner shown is spun.



The score is the dice number **substituted** into the spinner expression.

18 (a) Complete the table to show all of the possible scores.

[2 marks]

	1	**2**	**3**	**4**	**5**	**6**
$2x$				8		
$3x$		6				
x^2					25	

Do not write outside the box

18 (b) A player wins the game if their score is 10 or more.

Work out the probability that they win the game.

[1 mark]

Answer _____

18 (c) The game is played 711 times.

Estimate the number of games that are won.

[2 marks]

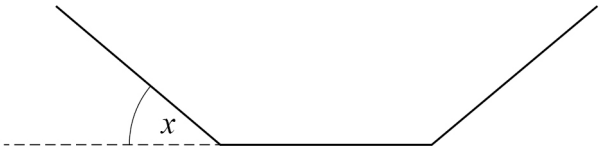
Answer _____

Turn over for the next question

5

Do not write outside the box

19 (a) Part of a regular polygon is shown.



Not drawn accurately

Assume that the polygon is an octagon.

Work out the size of angle x.

[2 marks]

Answer _____ °

19 (b) In fact, the polygon has **more** sides than an octagon.

What does this mean about the size of angle x ?

Tick **one** box.

[1 mark]

☐ It is more than the answer to part (a)

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

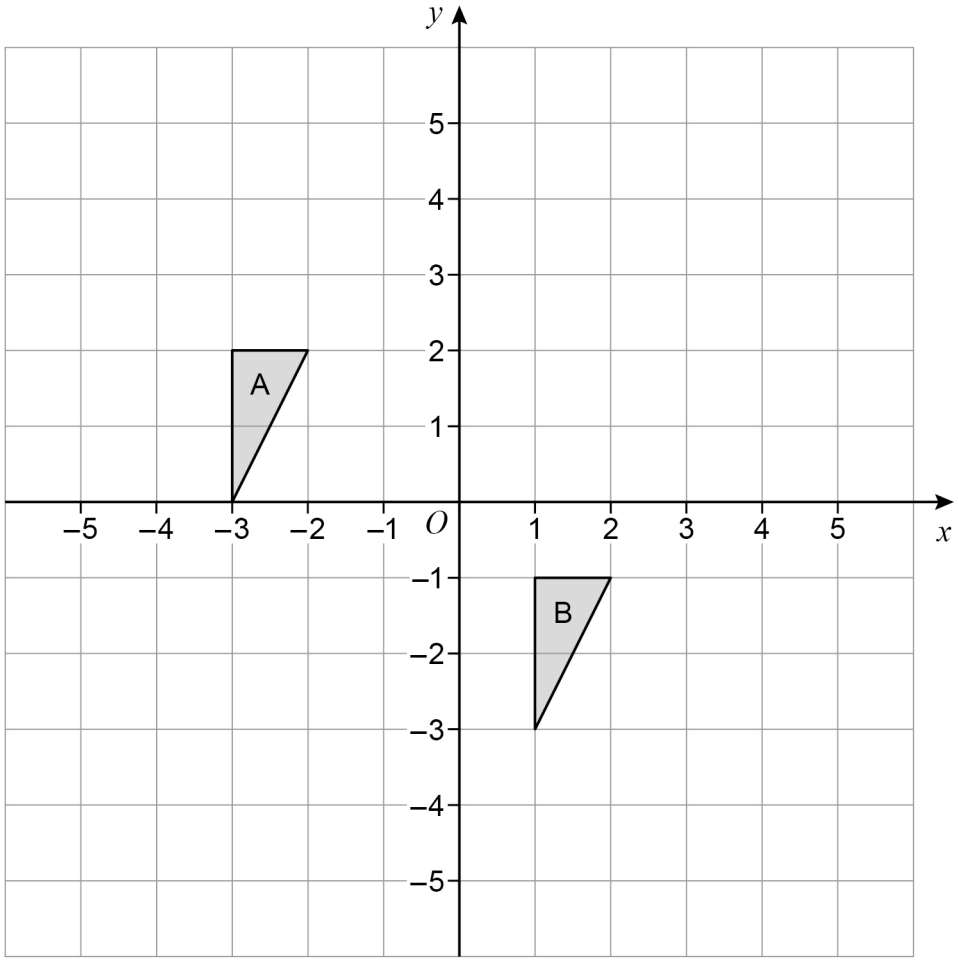
☐ It is less than the answer to part (a)

☐ It could be any of the above

Do not write outside the box

20 Write down the translation vector that maps shape A onto shape B.

[2 marks]



Answer _____

Turn over for the next question

5

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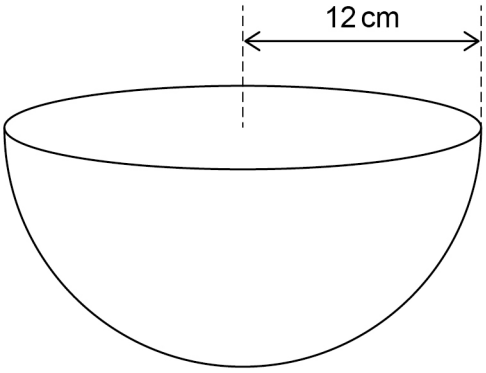
21

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

A bowl is a hemisphere with radius 12 cm



Water is poured into the bowl

at a rate of 325 cm^3 per second

for 8 seconds.

Does the water fill **more than** 70% of the bowl?

You **must** show your working.

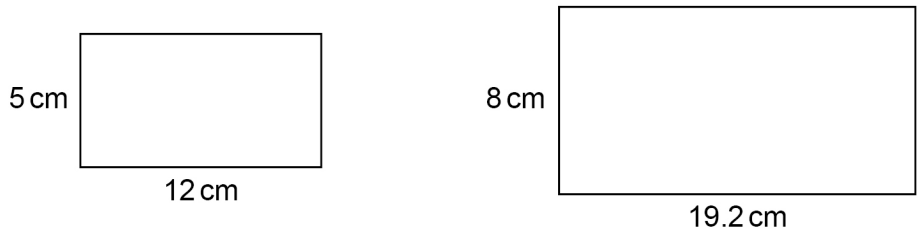
[4 marks]

Do not write outside the box

22 Show that these two rectangles are similar.

[2 marks]

Not drawn accurately



23 A factory packs x boxes of teabags per hour.

Each box contains 80 teabags.

Show that the factory packs $\frac{4x}{3}$ teabags per minute.

[2 marks]

END OF QUESTIONS

8

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There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED

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

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

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