



Please write clearly in block capitals.

Centre number

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Candidate number

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Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE

MATHEMATICS

Foundation Tier Paper 2 Calculator

F

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.

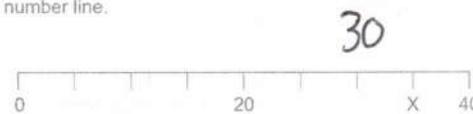
For Examiner's Use	
Pages	Mark
2-3	
4-5	
6-7	
8-9	
10-11	
12-13	
14-15	
16-17	
18-19	
20-21	
22-23	
24-25	
TOTAL	

2

Answer all questions in the spaces provided.

Do not write outside this box

- 1 (a) Here is a number line.



30

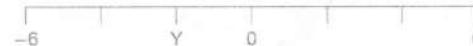
What number is at X?

[1 mark]

Answer

35

- 1 (b) Here is a different number line.



What number is at Y?

[1 mark]

Answer

-2



JUN 23 83002 F 01

8300/2F



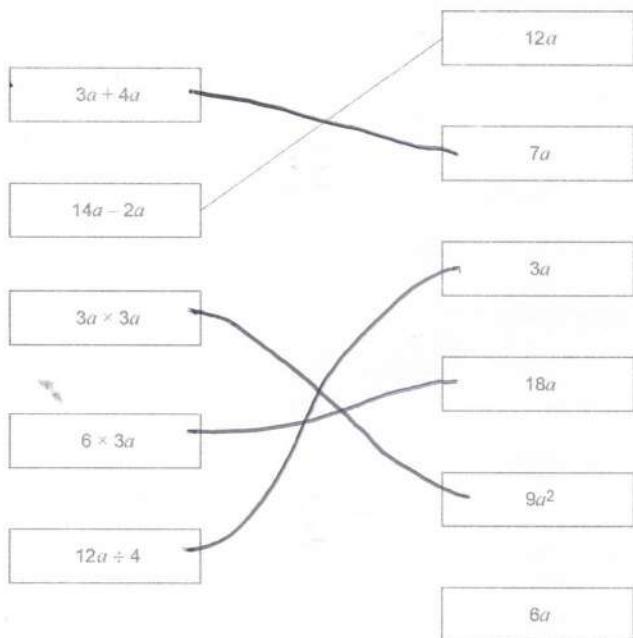
0 2

JUN 23 8300/2F

- 2 Match each expression on the left with the simplified expression on the right.
One has been done for you.

[4 marks]

Do not write outside the box



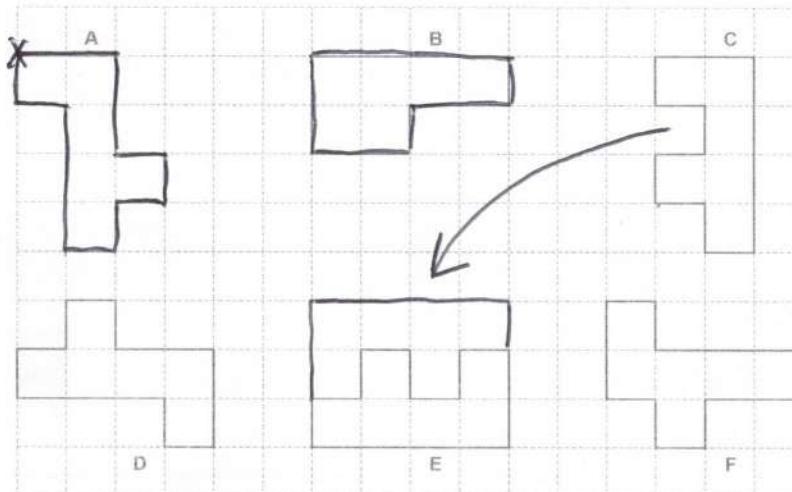
Turn over for the next question

6

Turn over ►

- 3 Here are some shapes.
Each shape has an area of six square centimetres.

Do not write outside the box



- 3 (a) Which has the bigger perimeter, shape A or shape B?
You must show the lengths of both perimeters.

$$A = 14 \quad B = 12$$

[2 marks]

Answer

A

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

[1 mark]

D

Answer



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

Do not write outside the box

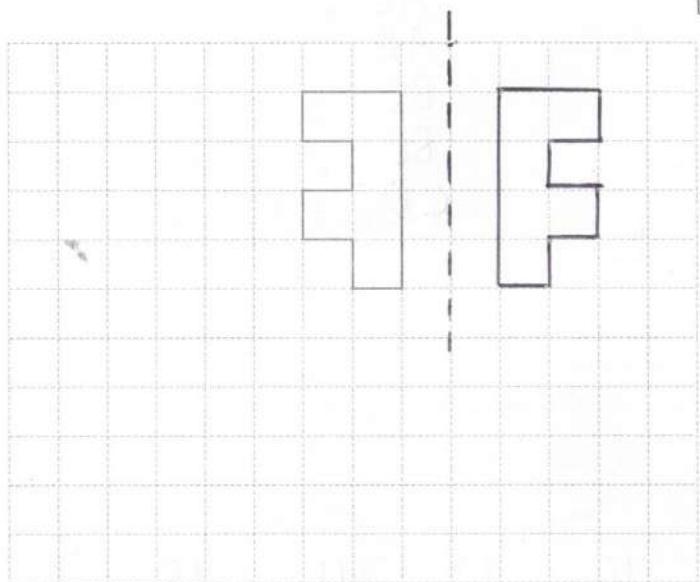
[1 mark]

Answer C and F

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

Show your mirror line.

[2 marks]



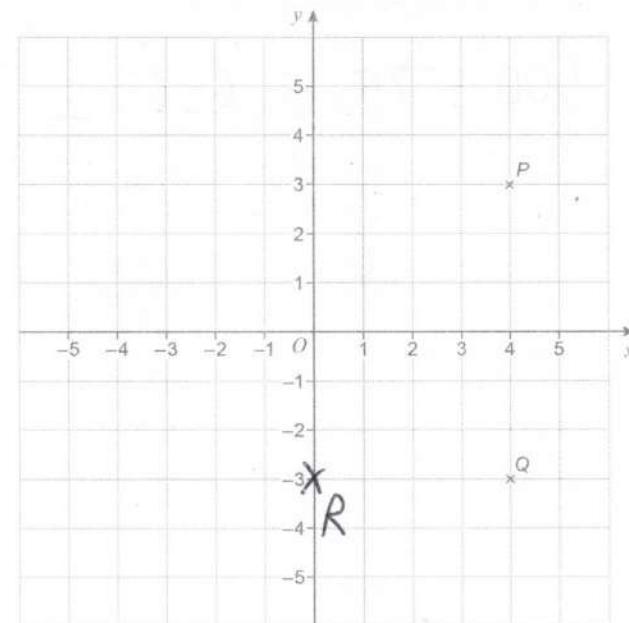
Turn over for the next question

6

Turn over ►

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

Do not write outside the box



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

[1 mark]

Answer (4 , 3)

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

Work out possible coordinates for R.

[1 mark]

Answer (0 , -3)

(Any ≠ 4 , -3)



0 5



0 6

- 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]

$$500 \div 75 = 6.6$$

Answer

6

Do not write outside the box

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

Shop X
pack of 4 bottles
Was £2.50
Now 10% off

Shop Z
pack of 12 bottles
£7

At which shop is it cheaper to buy 24 bottles?

Show working to support your answer.

(X) $6 \text{ packs} \times 2.25 = \underline{\underline{\text{£13.50}}}$ [4 marks]

(Z) $2 \text{ packs} \times 7 = \underline{\underline{\text{£14}}}$

Answer

X

8

Turn over ►



0 7

IB/M/Jun23/6309/2F

- 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]

Do not write outside the box

AB
AC
AD
BC
BD
CD

- 7 (a) Complete the boxes using

two different even numbers

and

two different odd numbers.

[2 marks]

$$10 + 12 + 11 + 13 = 46$$

22

24

IB/M/Jun23/6309/2F



0 8

IB/M/Jun23/6309/2F

- 7 (b) Complete the boxes using
a factor of 12

1, 2, 3, 4, 6, 12

and

a factor of 40

1, 2, 4, 5, 8, 10, 20, 40

[2 marks]

$$\boxed{3} \times \boxed{10} = 30$$

OR 6×5

- 7 (c) Complete the boxes using
a square number
and
a prime number.

1 4 9 16 25 36

2, 3, 5

[2 marks]

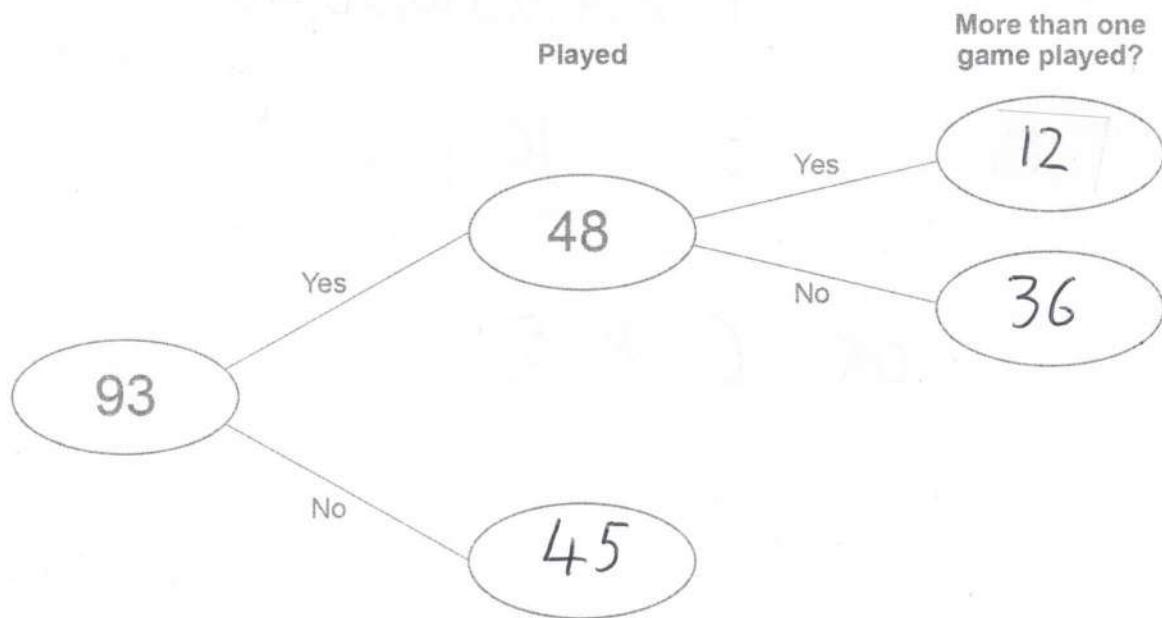
$$\boxed{36} \div \boxed{2} = 18$$

Turn over for the next question



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

The frequency tree shows some information about their answers.



- 8 (a) $\textcircled{75\%}$ of the people who answered $\textcircled{\text{Yes}}$ played one game.

Complete the frequency tree.

$$48 \times 0.75 = 36$$

[3 marks]



1 0

IB/M/Jun23/8300/2F

- 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]

$$93 \times 0.68 = 63.24$$

Answer

64

Turn over for the next question

5

Turn over ►



1 1

IB/M/Jun23/8300/2F

- 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.

$$6 \times 4 = 24$$

$$8 \times 11 = 88$$

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

[2 marks]

$$88 + 24$$

$$112$$

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]

$$\begin{array}{rcl} 9 \times 50 & = & 450 \text{m} \\ \text{hr } 42 & = & 102 \text{m} \end{array} +$$

$$= 552 \text{m}$$

$$\frac{552 \text{m}}{60} = 9.2 \text{hr} \text{ or } 9 \frac{1}{5} \text{ hr}$$

Answer

9

hours

12

minutes



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

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

How many are blue?

$$\frac{2}{5} \times 1020$$

[2 marks]

Answer

408

- 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

~~4~~
7

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

220 are scientific.

30 are not.

What percentage of the calculators are scientific?

[2 marks]

$$\frac{220}{250} \times 100$$

88

Answer

%

10

Turn over ►



1 3

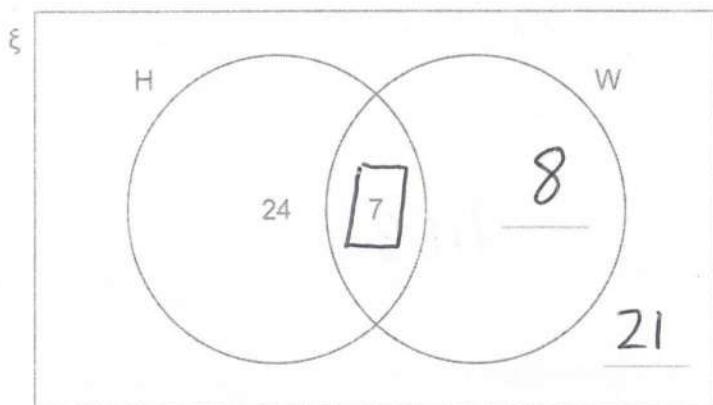
11

Here is a Venn diagram.

$$\xi = 60 \text{ people}$$

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.

$$60 - 39 = 21$$

[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]

$$\frac{7}{60}$$

Answer _____



1 4

- 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]

$$35 - 19 = 16$$

$$16 \div 2 = \underline{\underline{\text{£8}}} \text{ is the true amount}$$

His method gives £25.50

(oe)

Turn over for the next question



- 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]

$$\begin{array}{r} 3 : 2 \\ \times 3 \\ \hline 9 : 6 \end{array}$$

$$\begin{array}{r} 1.5 : 1 \\ \times 6 \\ \hline 9 : 6 \end{array}$$



- 13 28 is increased by 25%
40 is decreased by 15%

Which answer is bigger?
Show how you decide.

Do not write outside the box

[4 marks]

$$28 \times 1.25 = 35$$

$$40 \times 0.85 = 34$$

Answer

35

Turn over for the next question

6

Turn over ►



17

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14

Factorise $12a + 15b$ Do not write
outside the
box

[1 mark]

Answer $3(4a + 5b)$

15

Write down all the integers that satisfy the inequality

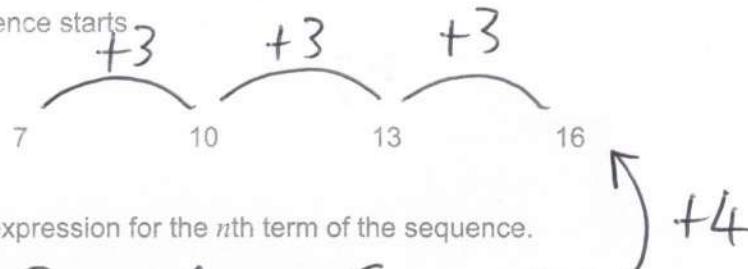
$$-3 \leq x < 2$$

[2 marks]

Answer -3, -2, -1, 0, 1

16

A linear sequence starts

Work out an expression for the n th term of the sequence.

$$3n \quad 3 \quad 6 \quad 9 \quad 12$$

[2 marks]

Answer $3n + 4$



- 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.

$$45 \times 8 = 360$$

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

Give your answer in its simplest form.

[4 marks]

$$45 \times 10 = 450p$$

$$1770 - 450 = 1320p$$

$$2p \times 360 = 720p$$

$$1320 - 720 = 600p \text{ in } 5p$$

$$(2p) : (5p)$$

$$\begin{array}{r} 720 : 600 \\ 72 : 60 \end{array}$$

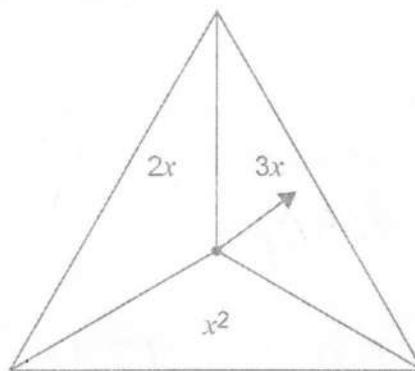
Answer 6 : 5



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	2	4	6	8	10	12
3x	3	6	9	12	15	18
x^2	1	4	9	16	25	36



- 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 $\frac{8}{18}$ or $\frac{4}{9}$

- 18 (c) The game is played 711 times.

Estimate the number of games that are won.

[2 marks]

$\frac{4}{9} \times 711$

Answer 316

Turn over for the next question



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



Not drawn
accurately

Assume that the polygon is an octagon. $= 8$

Work out the size of angle x .

[2 marks]

$$360 \div 8$$

$$45$$

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)

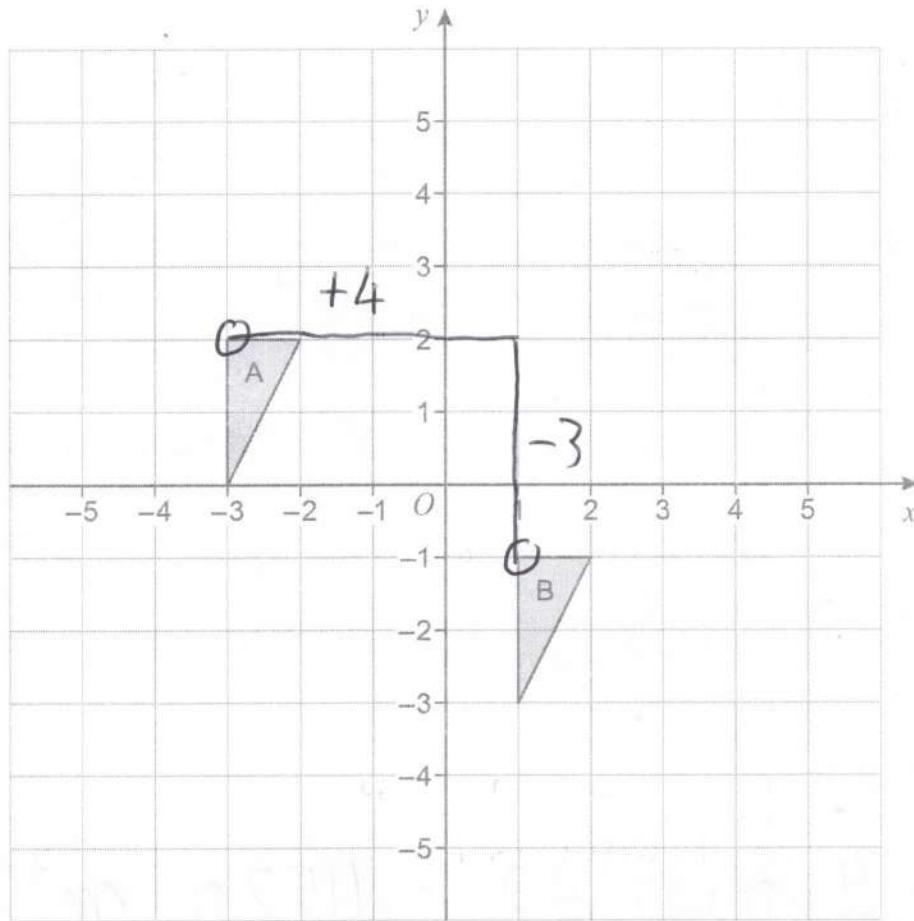
It could be any of the above



20

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

[2 marks]

Do not write
outside the
box

Answer

$$\begin{bmatrix} 4 \\ -3 \end{bmatrix}$$

Turn over for the next question

5

Turn over ►



2 3

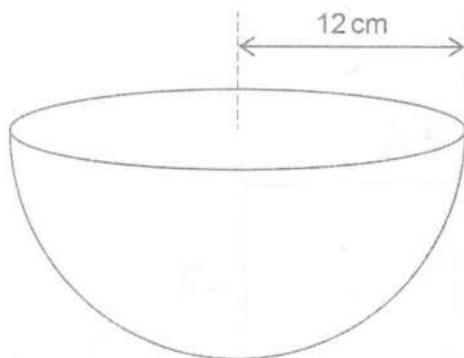
IB/M/Jun23/8300/2F

21

Do not write
outside the
box

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

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.

$$V = \frac{4}{3} \pi r^3 \div 2 = 1152 \pi \text{ cm}^3 \quad [4 \text{ marks}]$$

$$\begin{aligned} 70\% \text{ of } 1152\pi &= 1152\pi \times 0.7 \\ &= 2533.38, \dots \end{aligned}$$

$$8 \times 325 = 2600$$

$$2600 > 2533 \text{ so YES}$$



2 4

IB/M/Jun23/8300/2F

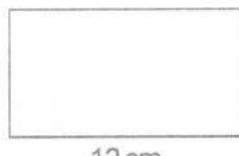
22

Show that these two rectangles are similar.

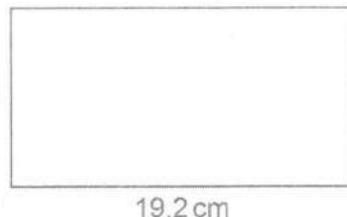
[2 marks]

Not drawn
accuratelyDo not write
outside the
box

5 cm



8 cm



$$\begin{aligned} 8 \div 5 &= 1.6 \\ 19.2 \div 12 &= 1.6 \end{aligned} \quad \left. \begin{aligned} & \text{same scale factor} \\ & \text{so similar} \end{aligned} \right\}$$

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.

80x bags in 1hr = 60mins

[2 marks]

$$1\text{min} = \frac{80x}{60} = \frac{8x}{6} = \frac{4x}{3}$$

END OF QUESTIONS

