Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE MATHEMATICS

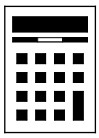
F

Foundation Tier Paper 2 Calculator

Friday 8 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	
24	
TOTAL	

Please note that these worked solutions have neither been provided nor approved by AQA and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue should be written in the exam.

Anything written in green in a rectangle doesn't have to be written in the exam.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

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

Do not write outside the box

1 (a) A linear sequence starts

4 7 10 13

Write down the next number in this sequence.

[1 mark]

Answer 16

The sequence increases by 3 between each term. 13 + 3 = 16

1 (b) A different linear sequence starts

19 14 9 4

Write down the next number in this sequence.

[1 mark]

Answer -1

The sequence decreases by 5 between each term. 4 - 5 = -1

1 (c) Here is another sequence.

3 6 12 24

Write down the term-to-term rule for this sequence.

[1 mark]

Answer × 2

The sequence multiplies by 2 between each term

Do not write outside the box

2 Here is a price list.

Soap	£2.00
Candle	£4.55
Lip scrub	£1.75
Body cream	£3.80

2 (a) Work out the cost of three candles.

[1 mark]

Answer £ 13.65

4.55 × 3 = 13.65

2 (b) Sal has £7.50

He wants to buy one soap and one body cream.

Does he have enough money to also buy one lip scrub?

Tick a box.

Yes ☐ No ☑

Show working to support your answer.

[2 marks]

2 + 3.80 + 1.75 = 7.55

Adding the costs of one soap, one body cream and one lip scrub works out that £7.55 would be needed. This is more than £7.50 so he does not have enough money

6

Do not write outside the box

3 (a) Solve $5x = 30$

[1 mark]

$x =$ 6

Dividing both sides by 5 gets x on its own. x = 30 ÷ 5 = 6

3 (b) Solve $-2 + y = 10$

[1 mark]

$y =$ 12

Adding 2 to both sides gets y on its own. y = 10 + 2 = 12

3 (c) Simplify fully $\frac{20w}{4w}$

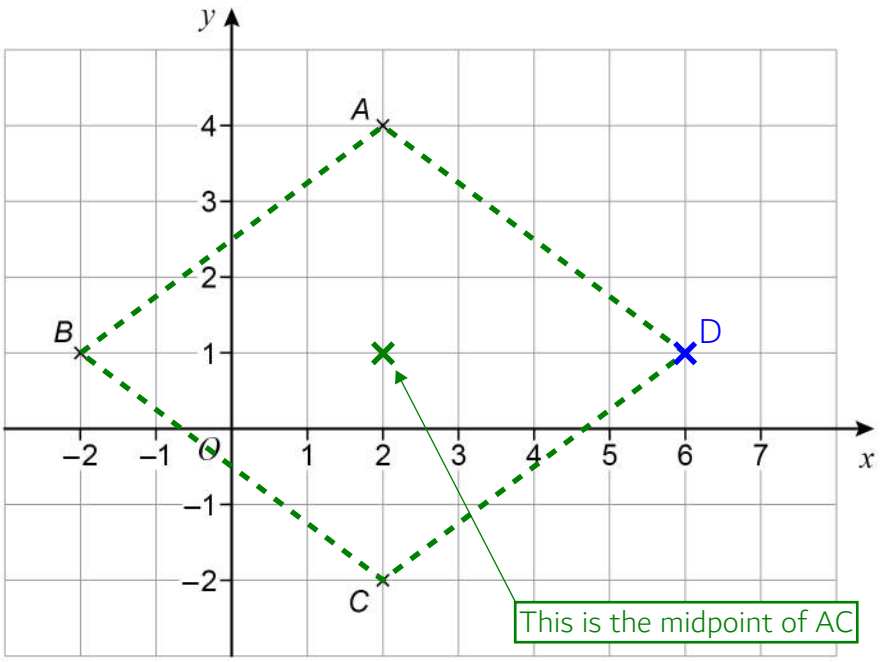
[2 marks]

Answer 5

20/4 = 5. As w is on the numerator and denominator they can be cancelled out

Do not write outside the box

4 Points *A*, *B* and *C* are plotted on a grid.



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

[1 mark]

Answer (2 , -2)

x-coordinate, y-coordinate

4 (b) Write down the coordinates of the midpoint of *AC*.

[1 mark]

Answer (2 , 1)

x-coordinate, y-coordinate

4 (c) Plot point *D* on the grid so that *ABCD* is a rhombus.

[1 mark]

A rhombus has four equal sides

7

Turn over ►

Do not write outside the box

5 Here are five numbers.

14.2 15.1 16.5 16.7 18.0

5 (a) Work out the range.

[1 mark]

18.0 - 14.2 ← Range = largest - smallest

Answer 3.8

5 (b) Work out the mean.

[2 marks]

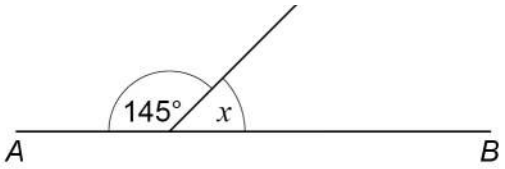
14.2 + 15.1 + 16.5 + 16.7 + 18.0 ← Adding all of the numbers works out that their total is 80.5

80.5 ÷ 5 ← Dividing the total of the numbers by how many numbers there are works out the mean

Answer 16.1

Do not write outside the box

6 (a) *AB* is a straight line.



Not drawn accurately

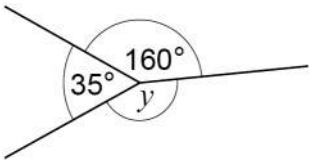
Work out the size of angle x.

[1 mark]

180 - 145 ← Angles around a point on a straight line add up to 180°. So subtracting the 145° from 180° leaves angle x

$x =$ 35 °

6 (b)



Not drawn accurately

Work out the size of angle y.

[2 marks]

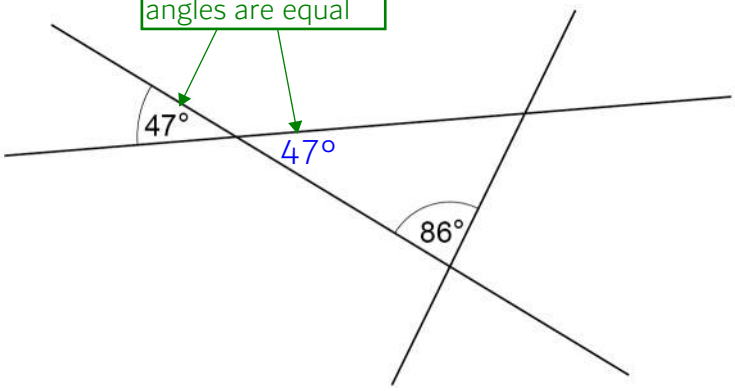
360 - 35 - 160 ← Angles around a point add up to 360°. So subtracting the 35° and 160° from 360° leaves angle y

$y =$ 165 °

6

Do not write outside the box

6 (c) Three straight lines intersect as shown.



Not drawn accurately

What type of triangle is made?

You **must** show your working.

[3 marks]

180 - 47 - 86 = 47 ← There are 180° in total in a triangle. So subtracting the 47° and 86° from 180° leaves the third angle

Answer isosceles

↑ As two of the angles are the same

Do not write outside the box

7 The table shows information about the packs of juice a family has.

Number of packs	Number of cartons in a pack
5	8
16	3

The family drinks 4 cartons of juice each day.

In total, how many days will their packs last?

[3 marks]

$5 \times 8 = 40$
$16 \times 3 = 48$
Multiplying the numbers of packs by the numbers of cartons in a pack works out that there are 40 cartons in the 5 packs and 48 cartons in the 16 packs

$40 + 48$ ← Adding the 40 and 48 cartons works out that there are 88 cartons in total

$88 \div 4$ ← Dividing the 88 cartons by the 4 cartons drank each day works out that they will last 22 days

Answer 22 days

Turn over for the next question

6

Do not write outside the box

8 100 people voted in an election for Jo, Kim or Liam.

The pictogram shows the results for Jo and Kim.

Key: ◯ represents 8 people

Jo	◯ ◯ ◯ ◯ ◯ ◯
Kim	◯ ◯ ◯ ◯ ◖
Liam	◯ ◯

Complete the pictogram.

[3 marks]

10.5 × 8 ← Counting the number of circles in the pictogram so far finds that there are 10.5 circles. Multiplying this by the 8 people which each circle represents works out that a total of 84 people voted for Jo and Kim combined

100 - 84 ← Subtracting the total of 84 people who voted for Jo and Kim combined from the 100 voters works out that 16 people voted for Liam

16 ÷ 8 = 2 ← Dividing the 16 who voted for Liam by the 8 which each circle represents works out that 2 circles are needed to be drawn for Liam

Do not write outside the box

9 Callum is making pizza.

He can choose three **different** toppings from

- ham (H)
- sweetcorn (S)
- onion (O)
- mushrooms (M).

List **all** the possible options for the three toppings.

The first one has been done for you.

[2 marks]

H S O
H S M
H O M
S O M

Using systematic listing and avoiding repeating the same combinations. For example, HOS is the same as HSO

Turn over for the next question

5

Do not write outside the box

10 (a) Write $\frac{3}{8}$ as a percentage.

[1 mark]

$\frac{3}{8} \times 100$ ← Multiplying any fraction by 100 converts it to a percentage

Answer 37.5 %

10 (b) Work out $\frac{15}{32}$ as a decimal.

Give your answer to 2 decimal places.

[2 marks]

Answer 0.47

Putting the fraction into the calculator and formatting it as a decimal gives 0.46875. Writing this to 2 decimal places

11 Tick **one** box for each statement.

[3 marks]

	True	May be true	Not true
If a number is > 0 the number is positive	✓		
If a number is $\leqslant 3$ the number is 1		✓	
If a number is $\geqslant 5$ the **smallest** possible value of the number is 5	✓		

A number greater than 0 is positive.

1 is less than 3 so this may be true but there are other numbers which are less than or equal to 3.

The smallest possible value which is greater than or equal to 5 is 5

Do not write outside the box

12 (a) Work out the value of $x^2 + 7x$ when $x = -4$

[2 marks]

$(-4)^2 + 7(-4)$ ← Substituting -4 for x. The -4 must be in brackets when raising to the power of 2

Answer -12

12 (b) Rearrange $y = w - 1$ to make w the subject.

[1 mark]

$w =$ $y + 1$

↑ Adding 1 to both sides eliminates the -1 and gets w on its own

12 (c) Simplify fully $4(a + 2) + a$

[2 marks]

$4a + 8 + a$ ← Expanding the brackets. 4 × a = 4a and 4 × 2 = 8

Answer $5a + 8$

↑ Collecting the like terms. 4a + a = 5a

11

Do not write outside the box

13 The time Shaz takes to run a race is 1 minute 28 seconds **less** than 2 hours.

Work out her time in hours, minutes and seconds.

[2 marks]

2° - 0°1°28° ← Subtracting the 1 minute and 28 seconds from the 2 hours as sexagesimals on the calculator

Answer 1 hour 58 minutes 32 seconds

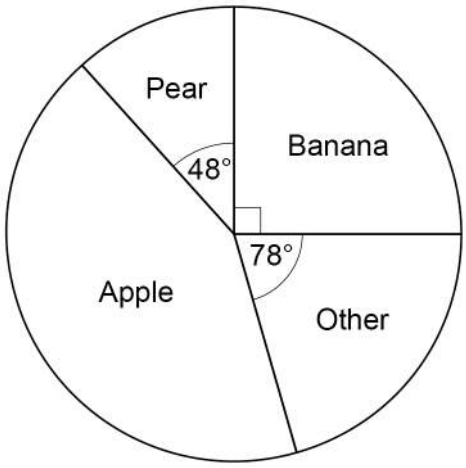
The answer of 1°58'32" can be read as 1 hour 58 minutes and 32 seconds

Do not write outside the box

14 Some people were asked to choose their favourite fruit.

The pie chart shows information about the results.

Not drawn accurately



120 people chose Banana.

How many people chose Apple?

[4 marks]

$360 - 48 - 90 - 78 = 144$ ← There are 360° in total in a pie chart. Subtracting the known angles from 360° leaves 144° for Apple

$120 \div 90$ ← Dividing the 120 people who chose Banana by the 90° representing them works out that each degree represents 4/3 people

$\frac{4}{3} \times 144$ ← Multiplying the number of people represented by each degree by the 144° for Apple works out that 192 people chose Apple

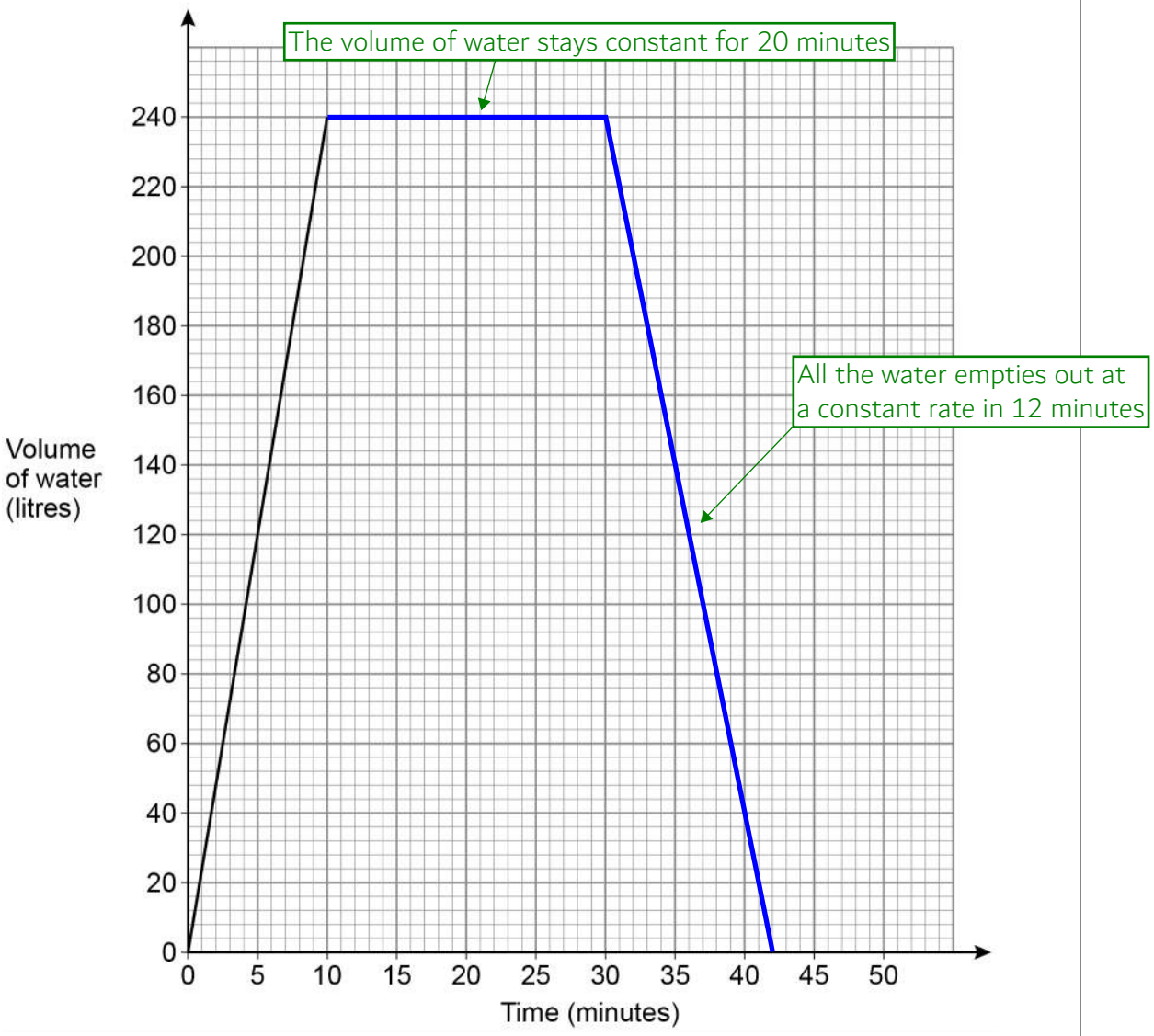
Answer 192

6

Do not write outside the box

15 The graph represents the volume of water in a bath.

The bath is full after 10 minutes.



15 (a) Work out the rate at which the bath is filled.

State the units of your answer.

[2 marks]

240 ÷ 10

The rate is how much is filled in each minute, or the gradient of the line. So dividing the 240 litres by the 10 minutes works out the rate

Answer 24 litres per minute

Per means to divide. The litres were divided by the minutes

Do not write outside the box

15 (b) After the bath is full,

the volume of water stays constant for 20 minutes

then

all the water empties out at a constant rate in 12 minutes.

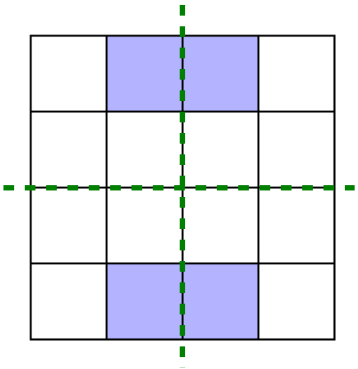
Show this information on the graph.

[2 marks]

16 In the grid below, shade **one quarter** of the squares so that the grid has exactly **two** lines of symmetry.

Shade complete squares only.

[2 marks]



1/4 of 16 squares is 4 squares so this many squares need to be shaded.
The lines of symmetry are dashed in green and do not need to be drawn

Turn over for the next question

6

Do not write outside the box

17 A map has a scale of 1 : 4000

On the map, the distance from a station to a museum is 7 cm

Is the **actual** distance from the station to the museum **more** than 300 m?

Tick a box.

Yes ☐ No ☑

Show working to support your answer.

[3 marks]

7×4000 ← The 4000 parts of the ratio is 4000 times the 1 part of the ratio. So multiplying the 7 cm on the map by 4000 works out that the actual distance is 28000 cm

$28000 \div 100 = 280$ ← There are 100 cm in 1 m so dividing the 28000 cm by 100 converts it to 280 m, which is not more than 300 m

18 X is inversely proportional to Y.

Circle the correct statement.

These both mean that as Y increases, X decreases

[1 mark]

X is directly proportional to Y

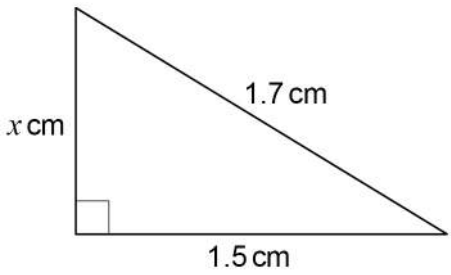
X is directly proportional to $\frac{1}{Y}$

X is directly proportional to $2Y$

X is directly proportional to $\sqrt{Y}$

Do not write outside the box

19 Here is a right-angled triangle.



Not drawn accurately

Use Pythagoras' theorem to show that $x = 0.8$

[2 marks]

$1.5^2 + x^2 = 1.7^2$ ← $a^2 + b^2 = c^2$, where a and b are the shorter sides and c is the longest side

$x^2 = 0.64$ ← Subtracting 1.5^2 from both sides to get the x^2 on its own

$x = 0.8$ ← Square rooting both sides finds x

Turn over for the next question

6

Do not write outside the box

20 Beth and Lynn each spin the same biased coin a number of times.

The table shows information about the results.

	Beth	**Lynn**
Number of spins	125	80
Relative frequency of Heads	0.32	0.35

20 (a) How many **more** Heads did Beth spin than Lynn?

[2 marks]

$0.32 \times 125 = 40$

$0.35 \times 80 = 28$

Multiplying the relative frequencies by the numbers of spins works out that Beth had 40 Heads and Lynn had 28 Heads

$40 - 28$

Subtracting the 28 Heads Lynn had from the 40 Heads Beth had works out that Beth had 12 more Heads than Lynn

Answer 12

20 (b) Lynn says,

"My estimate of the probability of the coin landing on Heads must be the best, because 0.35 is greater than 0.32"

Is she correct?

Tick a box.

Yes ☐ No ☑

Give a reason for your answer.

[1 mark]

Beth did more spins ← The more spins, the better the estimate

Do not write outside the box

21 Some oil has

a mass of 537 g

a density of 895 000 g/m^3

1 m^3 = 1000 litres

Work out the volume of the oil.

Give your answer in litres.

[2 marks]

d m v ← Writing the formula triangle for density, mass, volume

537 ÷ 895000 ← Covering v in the formula triangle finds that volume = mass ÷ density. The unit of density involved m^3 so the unit of volume is m^3

0.0006 × 1000 ← Each m^3 is 1000 litres so multiplying the 0.0006 m^3 by 1000 converts it to 0.6 litres

Answer 0.6 litres

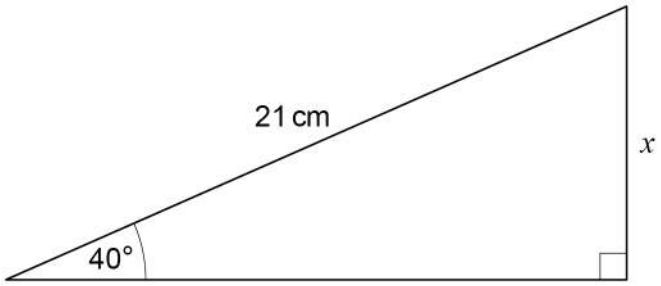
Turn over for the next question

5

Do not write outside the box

22 Use trigonometry to work out the value of x.

Not drawn accurately



O A O
S H C H T A

Writing SOH CAH TOA as formula triangles. Ticking O as x is the opposite and ticking H as 21 cm is the hypotenuse. There are two ticks on the SOH formula triangle so this can be used

[3 marks]

sin40 × 21

Covering O in the SOH formula triangle finds that opposite = sin of the angle × hypotenuse

Answer 13.5 cm

23 The length of a wall is 9 metres to the nearest metre.

Complete the error interval for the length of the wall.

[2 marks]

$9 \pm \frac{1}{2}$

Adding and subtracting half of the resolution to the measurement works out the upper and lower bound. The resolution is 1 m as it is to the nearest 1 m

Answer 8.5 m ⩽ length < 9.5 m

It must be at least 8.5 m but less than 9.5 m to round to 9 m to the nearest metre

Do not write outside the box

24 384 000 electric cars were sold this year.

This is 20% **more** than last year.

How many were sold **last year**?

[3 marks]

100 + 20 ← Adding 20% to 100% works out that it increased to 120% of last year

384000 ÷ 120 ← This works out that 1% of last year is 3200

3200 × 100 ← Multiplying 1% of last year by 100 works out that 100% of last year is 320000

Answer 320000

25 Here are three terms.

xy x^2 $5y^2$

Alec multiplies two of these terms.

Work out the **three** possible fully simplified answers.

[3 marks]

Answer x^3y ← $xy \times x^2$

Answer $5xy^3$ ← $xy \times 5y^2$

Answer $5x^2y^2$ ← $x^2 \times 5y^2$

11

Do not write outside the box

26 Here is a rectangle.

All measurements are in centimetres.

Not drawn accurately

$AB : BC = 1 : 3$

Work out the value of the area.

[5 marks]

$4x + 1 = 2x + 17$ ← Opposite sides of a rectangle are equal to AB = CD

$2x + 1 = 17$ ← Subtracting 2x from both sides to get all the x on the same side

$2x = 16$ ← Subtracting 1 from both sides to get the x term on its own

$x = 8$ ← Dividing both sides by 2 gets x on its own

$4 \times 8 + 1 = 33$ ← Substituting 8 for x in 4x + 1 finds that AB is 33 cm

33×3 ← From the ratio, BC is 3 times AB

33×99 ← Area of rectangle = length × width

Answer 3267 cm^2

END OF QUESTIONS

5