



Please write clearly in block capitals.

Centre number

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Candidate number

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Surname *StemUp Model Solution*

Forename(s)

Candidate signature

I declare this is my own work.

GCSE MATHEMATICS

F

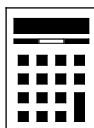
Foundation Tier Paper 3 Calculator

Wednesday 11 June 2025 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

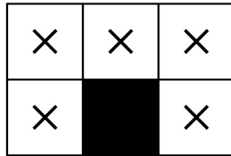
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
24–25	
TOTAL	



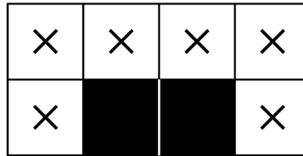
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Answer **all** questions in the spaces provided.

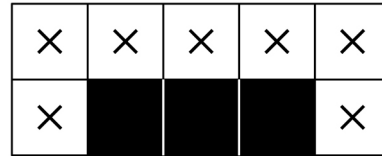
- 1** Here are the first three patterns in a sequence.



Pattern 1



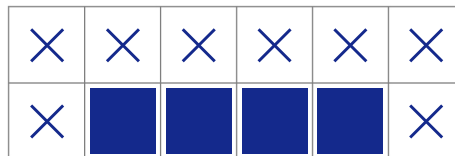
Pattern 2



Pattern 3

- 1 (a)** Draw Pattern 4 on the grid.

[1 mark]



- 1 (b)** How many squares in Pattern 6 would have a cross (X) in them?

[2 marks]

Number of crosses: 5, 6, 7, 8, 9, 10

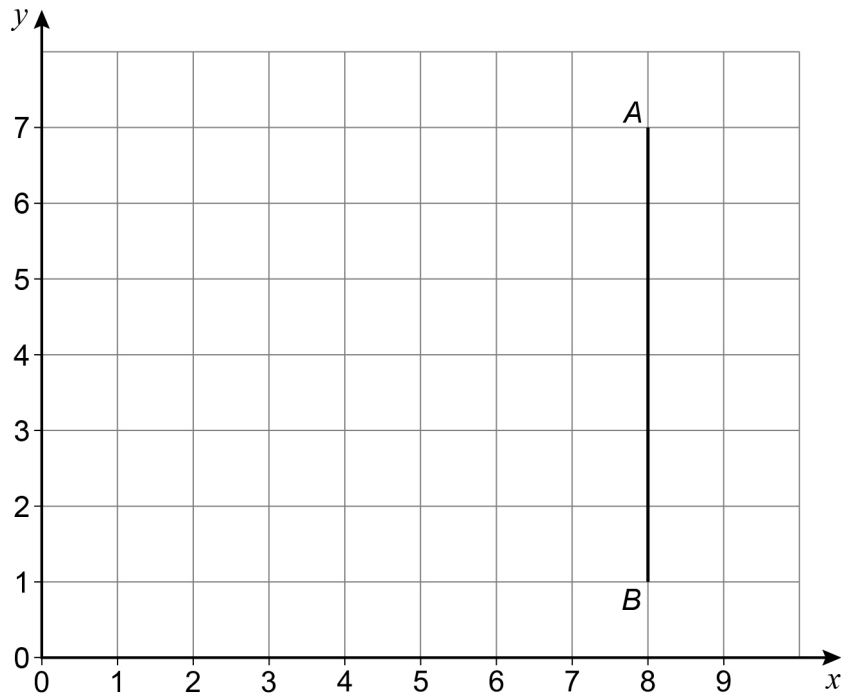
(one more cross each time)

Pattern 6 has 10 crosses

Answer 10



2 Line AB is on a grid.



2 (a) Write down the coordinates of B .

[1 mark]

Answer (8 , 1)

2 (b) Write down the coordinates of the midpoint of the line AB .

[1 mark]

Answer (8 , 4)



- 3 (a) Jodie makes a sandwich using one type of bread and one filling.

Bread	Filling
White (W) or Brown (B)	Cheese (C) or Ham (H) or Tuna (T)

Complete the table of the 6 possible sandwiches they could make.
One has been done for you.

[2 marks]

WC
WH
WT
BC
BH
BT

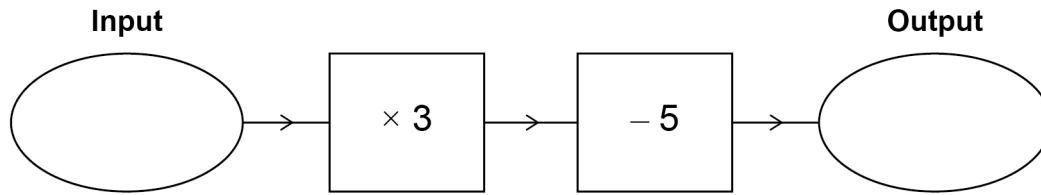
- 3 (b) What **fraction** of the possible sandwiches use Cheese?

[1 mark]

Answer $\frac{2}{6} = \frac{1}{3}$



- 4 Here is a number machine.



- 4 (a) Work out the **output** when the input is 4

[1 mark]

$$4 \times 3 = 12, \quad 12 - 5 = 7$$

Answer 7

- 4 (b) Work out the **input** when the output is 19

[2 marks]

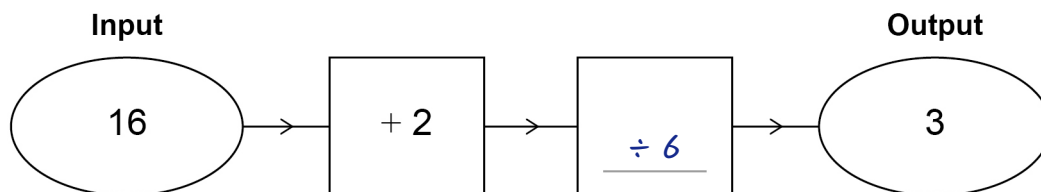
Work backwards:

$$19 + 5 = 24, \quad 24 \div 3 = 8$$

Answer 8

- 4 (c) Complete this number machine.

[1 mark]



$$16 + 2 = 18, \quad 18 \div 6 = 3$$



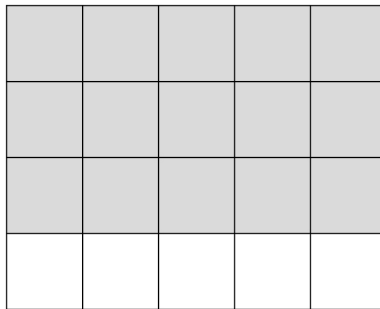
- 5 (a) Complete the table to show equivalent fractions, decimals and percentages.

[3 marks]

Fraction	Decimal	Percentage
$\frac{1}{2}$	0.5	50%
$\frac{1}{10}$	0.1	10%
$\frac{2}{5}$	0.4	40%

- 5 (b) What **percentage** of this grid is shaded?

[1 mark]



15 out of 20 squares shaded: $15 \div 20 \times 100 = 75$

Answer 75 %



6

Which metric unit would be **most** suitable for each measurement?Tick **one** box for each.

[3 marks]

	centimetres (cm)	metres (m)	kilometres (km)
Distance between two villages	☐	☐	☒
Length of a pencil	☒	☐	☐
Height of a building	☐	☒	☐

Turn over for the next question

Turn over ►



- 7 A mobile phone company has two different plans.

Plan A	Plan B
Phone £500	Phone is free
plus	plus
£11 per month for 24 months	£35 per month for 24 months

- 7 (a) Show that the **total** cost of Plan A for 24 months is £764

[2 marks]

$$£11 \times 24 = £264$$

$$£264 + £500 = £764$$

- 7 (b) During a sale, the **total** cost of Plan B is reduced by 10%

Which plan is cheaper for 24 months during the sale?

Tick a box.

☐

Plan A

☒

Plan B

Show working to support your answer.

[3 marks]

$$\text{Plan B: } £35 \times 24 = £840$$

$$10\% \text{ of } £840 = 0.1 \times 840 = £84$$

$$\text{Sale price: } £840 - £84 = £756$$

$$\text{Plan A} = £764, \text{ Plan B} = £756$$

$$£756 < £764 \text{ so Plan B is cheaper}$$



8

One burger costs £3.80

Two burgers and **three** hotdogs cost £15.85Work out the cost of **one** hot dog.**[3 marks]**

$$\text{Two burgers: } 2 \times £3.80 = £7.60$$

$$\text{Three hot dogs: } £15.85 - £7.60 = £8.25$$

$$\text{One hot dog: } £8.25 \div 3 = £2.75$$

Answer £ 2.75

Turn over for the next question

Turn over ►



- 9 (a) The square of a **whole** number is a two-digit number.

Work out

the **smallest** number that could have been squared
and
the **largest** number that could have been squared.

[3 marks]

$$3^2 = 9 \text{ (one digit), } 4^2 = 16 \text{ (two digits)}$$

$$9^2 = 81 \text{ (two digits), } 10^2 = 100 \text{ (three digits)}$$

So the two-digit squares are $4^2 = 16$ up to $9^2 = 81$

smallest 4

largest 9

- 9 (b) Which has the **larger** value 0.8^2 or 0.8^3 ?

Tick a box.

0.8^2



0.8^3



Give a reason for your answer.

[1 mark]

$$0.8^2 = 0.64 \text{ and } 0.8^3 = 0.512, \quad 0.64 > 0.512$$

(multiplying by 0.8, which is less than 1, makes it smaller)



- 10 (a)** £4.56 is paid using the smallest possible number of coins.

What is the **modal value** of the coins used?

You **must** show your working.

[2 marks]

$$\text{£}4.56 = \text{£}2 + \text{£}2 + 50p + 5p + 1p$$

Coins: £2, £2, 50p, 5p, 1p

£2 is used most often (twice)

Answer £2

- 10 (b)** Here is a list of five numbers.

5 9 4 16 8

An extra number is put into the list.

The **median** of the numbers is now 7

Work out the extra number.

[2 marks]

In order: 4, 5, 8, 9, 16

Six numbers: median is halfway between 3rd and 4th

Need 3rd and 4th to be 6 and 8: 4, 5, 6, 8, 9, 16

$$\text{Median} = (6 + 8) \div 2 = 7$$

Answer 6



11

Paul buys plates for his cafe.

The cafe has 20 tables.

He buys 6 plates for each table plus an extra 70% for spares.

Work out how many plates Paul buys in **total**.

[3 marks]

$$6 \times 20 = 120 \text{ plates}$$

$$\text{Spares: } 70\% \text{ of } 120 = 0.7 \times 120 = 84$$

$$\text{Total: } 120 + 84 = 204$$

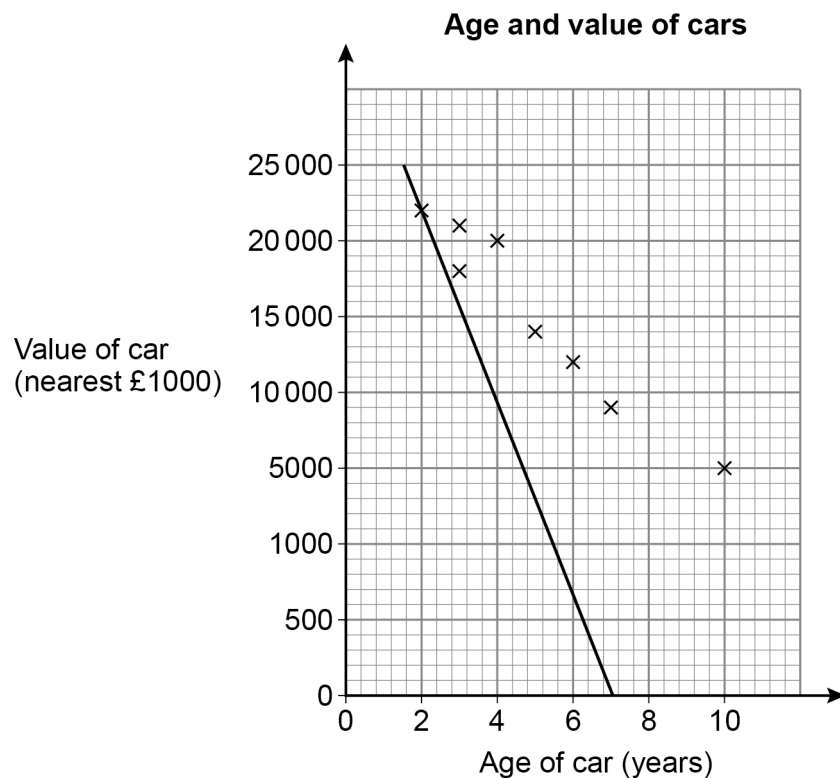
Answer 204



12 The table shows the age and value of some cars.

Age of car (years)	2	3	3	4	5	6	7	10
Value of car (nearest £1000)	22 000	21 000	18 000	19 000	14 000	12 000	9 000	5 000

Anil draws this scatter diagram and line of best fit for the data.



Write down **two** mistakes he has made.

[2 marks]

Mistake 1 The line of best fit is wrong: it does not go through the middle of the points.

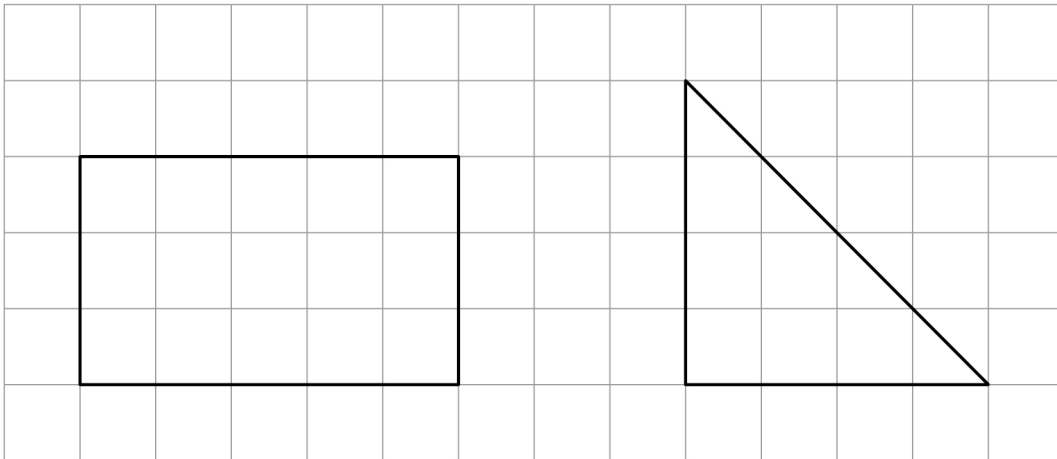
Mistake 2 The point for age 4 is plotted at £20 000 instead of £19 000.

Turn over ►



13

A rectangle and a triangle are drawn on a square grid.



Work out the ratio area of rectangle : area of triangle

[3 marks]*Rectangle: $5 \times 3 = 15$ squares**Triangle: $4 \times 4 \div 2 = 8$ squares**Ratio 15 : 8*Answer 15 : 8

- 14** A box contains cards that are either red, blue, green or yellow.

Colour	Red	Blue	Green	Yellow
Probability	0.1	0.24	0.33	0.33

- 14 (a)** $P(\text{green}) = P(\text{yellow})$

Complete the table.

[2 marks]

$$1 - (0.1 + 0.24) = 1 - 0.34 = 0.66$$

$$0.66 \div 2 = 0.33$$

- 14 (b)** There are 600 cards in the box.
How many cards are **not** blue?

[3 marks]

$$\text{Blue: } 600 \times 0.24 = 144$$

$$\text{Not blue: } 600 - 144 = 456$$

Answer 456



15

A and B are triangles.

For each statement, tick the correct box to describe A and B.

[3 marks]

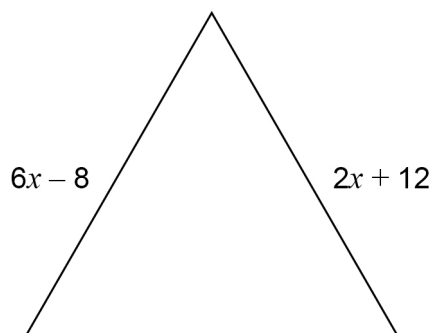
	Always congruent	Sometimes congruent	Never congruent
A's sides are the same lengths as B's sides	☒	☐	☐
A's angles are the same as B's angles	☐	☒	☐
A is an enlargement of B with scale factor 2	☐	☐	☒



16

Here is an equilateral triangle.

All measurements are in centimetres.

Not drawn
accurately

Work out the value of the perimeter of the triangle.

[4 marks]*Equilateral, so the sides are equal:*

$$6x - 8 = 2x + 12$$

$$6x - 2x = 12 + 8$$

$$4x = 20$$

$$x = 5$$

$$\text{Side} = 2 \times 5 + 12 = 22 \text{ cm}$$

$$\text{Perimeter} = 3 \times 22 = 66 \text{ cm}$$

Answer 66 cm

Turn over ►



- 17** Sid and Zak each throw the same biased coin.
Here is some information about their throws.

Sid	80 throws	Relative frequency of Heads is 0.75
Zak	120 throws	72 are Heads

- 17 (a)** Work out the relative frequency of Heads for the **200** throws.

[2 marks]

$$\text{Sid heads: } 0.75 \times 80 = 60$$

$$\text{Total heads: } 60 + 72 = 132$$

$$132 \div 200 = 0.66$$

Answer 0.66

- 17 (b)** Which results would give the **best** estimate of the probability of Heads?

Tick **one** box.

☐

Sid's 80
throws

☐

Zak's 120
throws

☒

All 200 throws

Give a reason for your answer.

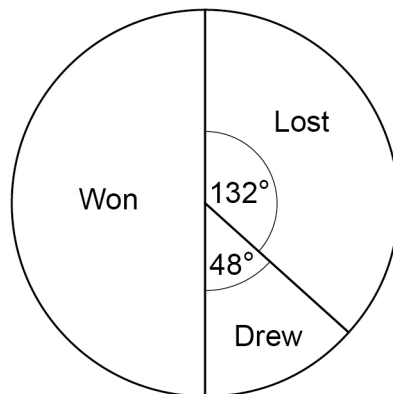
[1 mark]

*It uses the most throws (200): more trials gives a
better estimate of the probability.*



18

The pie chart represents the results of matches played by a team.



30 matches were **won**.

How many matches were lost?

[3 marks]

$$\text{Won angle} = 360^\circ - 132^\circ - 48^\circ = 180^\circ$$

$$180^\circ = 30 \text{ matches, so } 180 \div 30 = 6^\circ \text{ per match}$$

$$\text{Lost: } 132 \div 6 = 22$$

Answer 22

Turn over for the next question

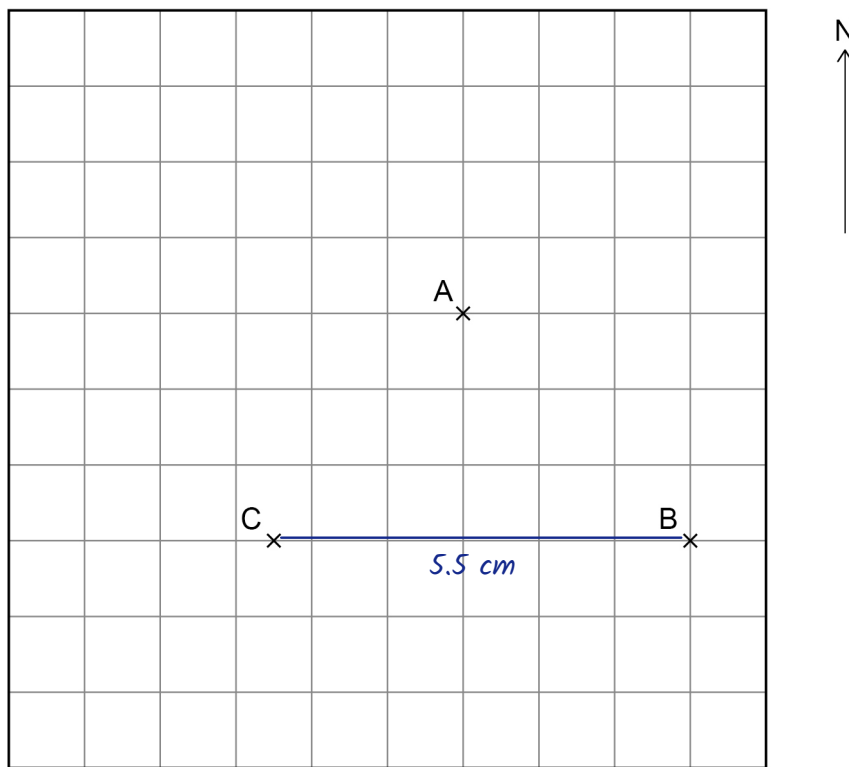
Turn over ►



19

Here is a scale diagram showing towns A, B and C on a centimetre grid.

Scale 1 : 200 000



- 19 (a) Work out the **actual** distance from B to C.
Give your answer in kilometres.

[4 marks]

BC on the diagram = 5.5 cm

$5.5 \times 200\,000 = 1\,100\,000\text{ cm}$

$1\,100\,000 \div 100 = 11\,000\text{ m}$

$11\,000 \div 1000 = 11\text{ km}$

Answer 11 km



19 (b) B is South East of A.

Write down the bearing of B from A.

[1 mark]

Answer 135 °

20 A linear sequence has

- 2nd term = 6
- 5th term = 18

Work out the n th term of the sequence.

[3 marks]

2nd to 5th term is 3 steps: $(18 - 6) \div 3 = 4$

Common difference = 4, so $4n$

Sequence: 2, 6, 10, 14, 18 $4n$: 4, 8, 12, 16, 20

$2 - 4 = -2$, so n th term = $4n - 2$

Answer $4n - 2$

Turn over for the next question

Turn over ►



21

Ary, Bea and Cat each have an amount of money.

Cat has £280

- Cat's amount is $\frac{2}{3}$ of Bea's amount.
- Ary's amount : Bea's amount = 5 : 12

Work out how much money Ary has.

[3 marks]

$$\text{Cat} = \frac{2}{3} \text{ of Bea, so Bea} = 280 \div 2 \times 3 = \text{£}420$$

$$\text{Ary : Bea} = 5 : 12$$

$$12 \text{ parts} = \text{£}420, 1 \text{ part} = 420 \div 12 = \text{£}35$$

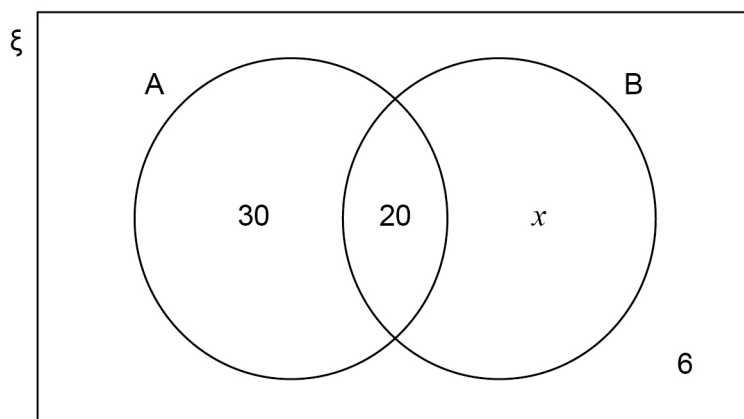
$$\text{Ary} = 5 \times 35 = \text{£}175$$

Answer £ 175



22

The Venn diagram shows some of the **numbers** of items in each set.



$$P(A) = \frac{1}{2}$$

Work out the value of x .

[2 marks]

$$A = 30 + 20 = 50, \quad P(A) = 1/2 \quad \text{so} \quad \text{total} = 2 \times 50 = 100$$

$$x = 100 - 30 - 20 - 6$$

$$x = 44$$

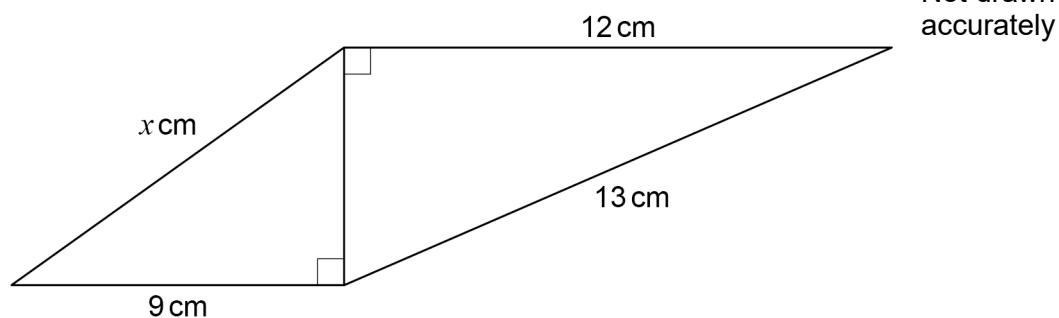
$$x = \underline{\hspace{2cm} 44 \hspace{2cm}}$$

Turn over for the next question

Turn over ►



23

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outside the
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Use Pythagoras' theorem to show that the value of x is between 10 and 11

[4 marks]

Let h be the vertical side (common to both triangles).

$$h^2 = 13^2 - 12^2 = 169 - 144 = 25$$

$$h = \sqrt{25} = 5 \text{ cm}$$

$$x^2 = 9^2 + 5^2 = 81 + 25 = 106$$

$$x = \sqrt{106} = 10.2956\dots$$

$$10^2 = 100 \text{ and } 11^2 = 121, \quad 100 < 106 < 121$$

So $10 < x < 11$: x is between 10 and 11



24 (a) Write down the equation of a straight line parallel to $y - 2x = 9$

[1 mark]

$y - 2x = 9$ is $y = 2x + 9$, gradient 2

Answer $y = 2x + 1$

24 (b) A straight line

- has gradient 5
- passes through the point (3, 7)

Circle the equation of the line.

[1 mark]

$$y = 3x - 2$$

$$y = 3x + 7$$

$$y = 5x$$

$$y = 5x - 8$$

END OF QUESTIONS



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