NEW SPECIMEN PAPERS
PUBLISHED JUNE 2015

GCSE
Mathematics
Specification (8300/1F)

F

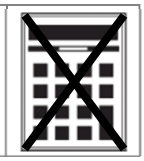
Paper 1 Foundation tier

Date | Morning | 1 hour 30 minutes

Materials

For this paper you must have:
- mathematical instruments

You must **not** use a calculator



Model Solutions

Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the bottom 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.
- Do all rough work in this book.
- In all calculations, show clearly how you work out your answer.

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.

Please write clearly, in block capitals, to allow character computer recognition.

Centre number ☐☐☐☐☐ Candidate number ☐☐☐☐

Surname ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Forename(s) ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Candidate signature _____

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

1 How many centimetres are there in 3.7 metres?

Circle your answer.

[1 mark]

0.037 0.37 37 (370)

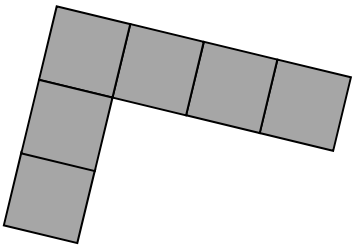
3.7 m → (×100) 370 cm

2 Which of these is the **net** of a **cube**?

Circle the correct letter.

[1 mark]

A



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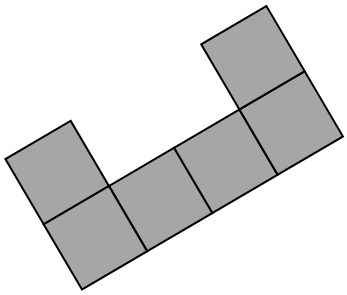
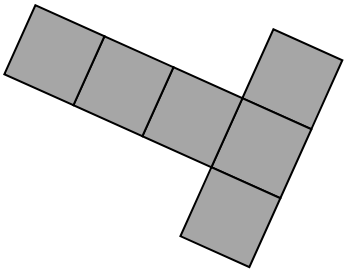
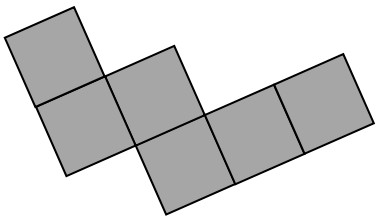


C



D



3 Circle the fraction that is **not** equivalent to $\frac{3}{8}$

[1 mark]

$\frac{6}{16}$ $\frac{9}{24}$ $\frac{12}{32}$ $\frac{15}{35}$

$\frac{15}{35} = \frac{3}{7}$ not $\frac{3}{8}$

4 Simplify $5a - (2a + 6)$

Circle your answer.

[1 mark]

$3a + 6$ $9a$ $-3a$ $3a - 6$

$5a - (2a + 6)$
$= 5a - 2a - 6$
$= 3a - 6$

Turn over for the next question

5 Complete the table.

[2 marks]

Minutes	Hours
30	$\frac{1}{2}$
40	$\frac{2}{3}$
135	$2\frac{1}{4}$

$\frac{40}{60} = \frac{4}{6} = \frac{2}{3}$

2 1/4 = 2.25
2.25 × 60 =
(2 × 60) + (0.25 × 60) =
120 + 15 = 135 minutes

6 Here are some numbers.

9.6 12.6 15.4 7.6 12.4 17.4

Write the numbers in pairs so that the **sum** of the numbers in each pair is the same.

[2 marks]

$\frac{9.6 + 12.6 + 15.4 + 7.6 + 12.4 + 17.4}{3} = \frac{75}{3} = 25$

So each pair adds to 25.

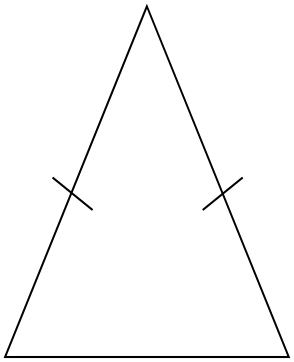
7.6 + 17.4 = 25
9.6 + 15.4 = 25
12.4 + 12.6 = 25

Answer 7.6 and 17.4

9.6 and 15.4

12.4 and 12.6

7 This triangle is drawn accurately.



What type of triangle is it?

Tick **two** boxes.

[1 mark]

acute-angled	☑ Each angle less than 90°
obtuse-angled	☐
equilateral	☐
isosceles	☑ Two equal sides
scalene	☐

Turn over for the next question

8 Work out 51% of 400

[2 marks]

So (50% of 400) + (1% of 400)

200 + 4 = 204

Answer 204

9 Write 180 g as a fraction of 3 kg

Give your answer in its simplest form.

[2 marks]

3 kg = 3000 grams

$\frac{180\text{ g}}{3000\text{ g}} = \frac{18}{300} = \frac{6}{100} = \frac{3}{50}$

Answer $\frac{3}{50}$

10 Here are some properties of numbers.

A Even
B Odd
C Prime
D Square
E Two-digit

10 (a) Which **two** properties does the number 4 have?
Circle the correct letters.

[1 mark]

(A) B C (D) E

$2 \times 2 = 4$ $\sqrt{4} = 2$

10 (b) Can one number have **all** of the properties?
Tick a box.

☐ Yes ☑ No ☐ Cannot tell

Give a reason for your answer.

[1 mark]

A number can't be odd and even at the same time.

10 (c) Write down a number with **three** of the properties.
State which properties it has.

[2 marks]

16

Even → $2 \times 8 = 16$

Square number → $\sqrt{16} = 4$

2 digits → 1, 6

Number 16

Properties A , D , E

11 Ranjit has six coins in his pocket.

If he picks **five** of the coins

the most he could pick is £4.60

the least he could pick is £2.70

How much money does he have altogether?

[4 marks]

5 coins

To make £4.60 → £2 , £2 , 20p , 20p , 20p

5 coins

To make £2.70 → £2 , 20p , 20p , 20p , 10p

So 6 coins he has is £2 , £2 , 20p , 20p , 20p , 10p

Total = £4.70

Answer £ 4.70

12 Here are three expressions.

$$\frac{b}{a} \qquad a - b \qquad ab$$

When $a = 2$ and $b = -6$ which expression has the smallest value?

You **must** show your working.

[2 marks]

$\frac{b}{a} \rightarrow \frac{-6}{2} = -3$

$a - b \rightarrow 2 - -6 = 2 + 6 = 8$

$ab \rightarrow 2 \times -6 = -12$ = smallest

Answer ab

Turn over for the next question

13 The table shows the ratio of teachers to children needed for two activities.

	teachers : children
Climbing	1 : 4
Walking	1 : 9

13 (a) There are 7 teachers to take children climbing.

What is the greatest number of children that can go climbing?

[1 mark]

T : C
1 : 4 ×7 → 7 : 28

Answer 28

13 (b) 49 children want to go walking.

What is the smallest number of teachers needed?

[1 mark]

T : C
1 : 9
×49/9 → 49/9 : 49 ×49/9

49/9 → 9, 18, 27, 36, 45, 54, 63
5

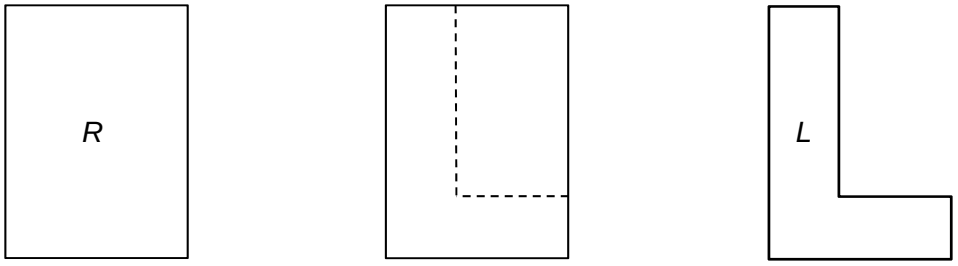
5 teachers can take 45 children
so we need 6 teachers for 49.

Answer 6

14 Shape *R* is a rectangle.

A smaller rectangle is cut from *R* to form shape *L*.

Not drawn accurately



Which **one** of these statements is true?

Tick a box.

[1 mark]

The perimeter of *R* is **longer than** the perimeter of *L* ☐

The perimeter of *R* is the **same as** the perimeter of *L* ☑

The perimeter of *R* is **shorter than** the perimeter of *L* ☐

It is **not** possible to tell which perimeter is longer ☐

Turn over for the next question

15 Textbooks are stored on two shelves.

Each shelf is 0.72 metres long.

Each textbook is 30 millimetres wide.

Not drawn accurately

Can 50 textbooks be stored on these shelves?

You **must** show your working.

[3 marks]

×100 ×10

Two shelves total length → 0.72 + 0.72 = 1.44m = 144cm = 1440mm

$\frac{1440}{30} = \frac{144}{3} \rightarrow \frac{120}{3} + \frac{24}{3} = 40 + 8 = 48$ books can fit only.

Answer No, only 48 can fit.

16 All tickets for a concert are the same price.

Amy and Dan pay £63 altogether for some tickets.

Amy pays £24.50 for 7 tickets.

How many tickets does Dan buy?

[4 marks]

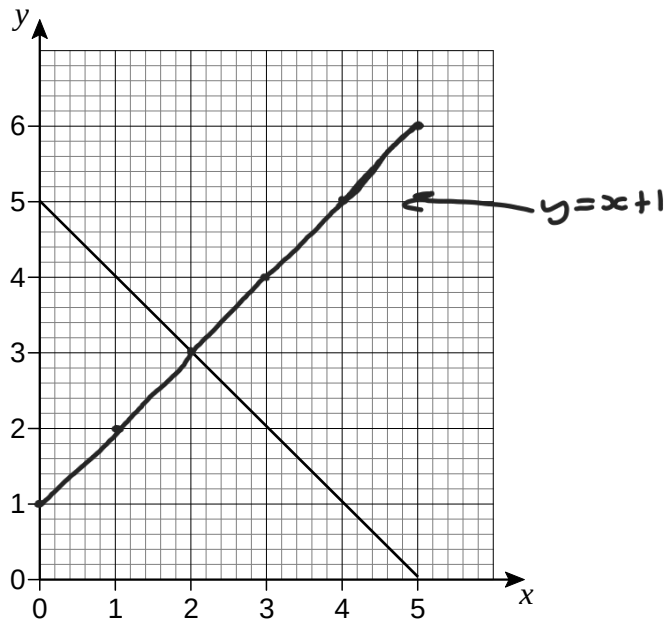
£24.50 / 7 = 1 ticket price = 7 ⟌ 24.50 = £3.50 per ticket

£63 − £24.50 = £38.50

£38.50 / £3.50 → 35 ⟌ 385 = 11 tickets

Answer 11

17 Here is the graph of $y = 5 - x$ for values of x from 0 to 5



17 (a) On the same grid, draw the graph of $y = x + 1$ for values of x from 0 to 5

[2 marks]

x	0	1	2	3	4	5
y	1	2	3	4	5	6

17 (b) Use the graphs to solve the simultaneous equations

$y = 5 - x$ and $y = x + 1$

[1 mark]

point where lines intersect

(2, 3)

so $x = 2$, $y = 3$

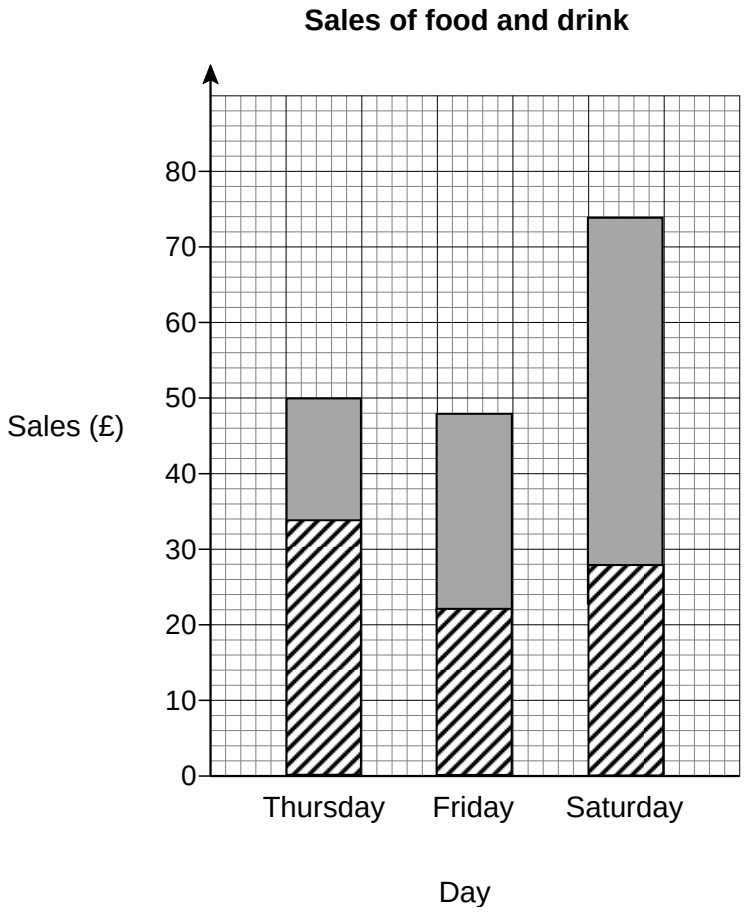
$x =$ 2

$y =$ 3

18 The table shows the sales of food and drink for three days at a market stall.

Day	Sales of food (£)	Sales of drink (£)
Thursday	34	16
Friday	22	48
Saturday	46	28

Hannah uses this information to draw a composite bar chart.



Write down **three** different mistakes that she has made.

[3 marks]

Mistake 1 There is no key

Mistake 2 Friday should reach £70

Mistake 3 Saturdays bars are wrong way around

19 Sam wants to buy a camera for £345

He has already saved £96

Each week

his pay is £80

he saves 30% of this pay.

How many **more** weeks must he save?

[4 marks]

£345 − £96 = £249 left to save

Saves 30% of £80 each week → 0.3 × £80 = 3 × 8 = £24

$\frac{£249}{£24} = \frac{£240}{£24} + \frac{£9}{£24} = 10.\text{Something}$

So needs 11 weeks

Answer 11 weeks

20 (a) w and x are **whole** numbers.

$w > 40$

$x < 30$

Work out the **smallest** possible value of $w - x$

[2 marks]

Smallest w – largest x

$41 - 29 = 12$

Answer 12

20 (b) y and z are **whole** numbers.

$y < 60$

$z \leqslant 50$

Work out the **largest** possible value of $y + z$

[2 marks]

Largest y + Largest z

$59 + 50 = 109$

Answer 109

21 (a) Work out 2.4×0.002

[1 mark]

$2.4 \times 0.002 = 24 \times 0.0002$
$= 0.0048$

Answer 0.0048

21 (b) Write 1.2×10^{-5} as an ordinary number.

[1 mark]

5 4 3 2 1
0.00001 2 → 0.000012

Answer 0.000012

21 (c) Write 2 500 000 in standard form.

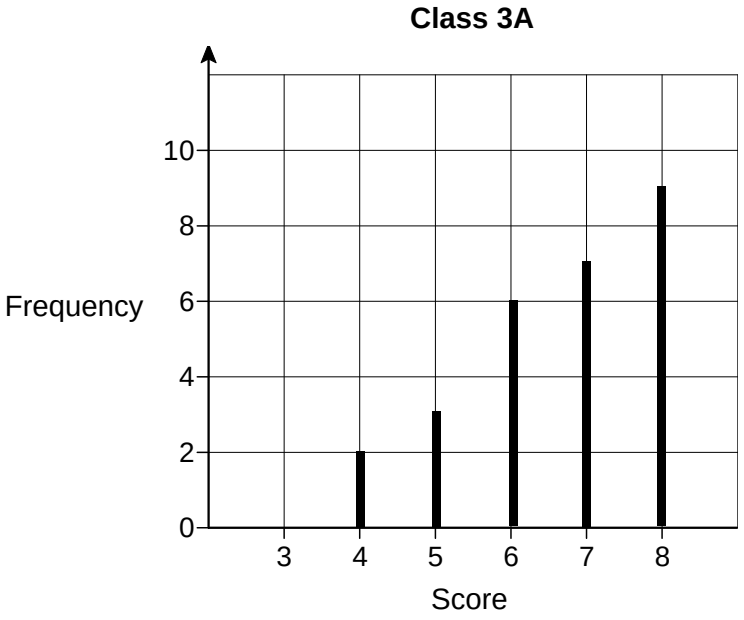
[1 mark]

6 5 4 3 2 1
2500000.0 → 2.5×10^6

Answer 2.5×10^6

Turn over for the next question

22 The diagram shows information about the scores of Class 3A in a spelling test.



22 (a) A student is chosen at random from Class 3A.

Work out the probability that the student's score was the **mode** for the class.

[3 marks]

Mode = most = 8 score

$$\frac{\text{people with 8 score}}{\text{All students}} \rightarrow \frac{9}{2+3+6+7+9} = \frac{9}{27} = \frac{1}{3}$$

Answer 1/3

The diagram shows information about the scores of Class 3B in the same test.

22 (b) Show that Class 3A had more **consistent** scores than Class 3B.
Use the data from both diagrams.

[2 marks]

Range of class 3A → 8−4 = 4

Range of class 3B → 8−3 = 5

3A has smaller range so their scores are more consistent.

22 (c) Lucy is one of the 29 students in **Class 3B**.
Her score was the same as the **median** score for her class.

Work out her score.

[2 marks]

Number of students → 2+2+4+7+8+6 = 29

Median position = $\frac{29+1}{2}$ = 15th position

15th value = 6

Answer 6

23 Kelly is trying to work out the two values of w for which $3w - w^3 = 2$

Her values are 1 and −1

Are her values correct?

You **must** show your working.

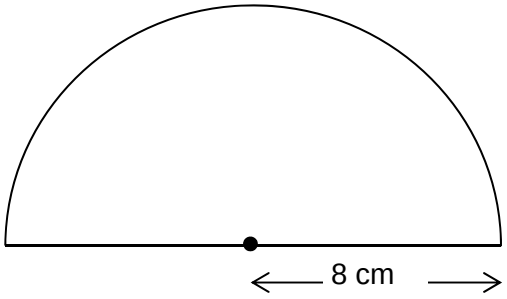
[2 marks]

$1 \rightarrow 3w - w^3 = 2 \rightarrow 3(1) - (1)^3 = 3 - 1 = 2$ ✓

$-1 \rightarrow 3w - w^3 = 2 \rightarrow 3(-1) - (-1)^3 = -3 - -1 = -2$ ✗

Only correct answer is $w = 1$

24 The diagram shows a semicircle of radius 8 cm



Not drawn accurately

Work out the area of the semicircle.

Give your answer in terms of π.

[2 marks]

$\frac{1}{2}\pi r^2 \rightarrow \frac{1}{2}\pi(8)^2 = \frac{1}{2} \times 64\pi$

$= 32\pi \text{ cm}^2$

Answer 32π cm^2

25 Work out $2\frac{3}{4} \times 1\frac{5}{7}$

Give your answer as a mixed number in its simplest form.

[3 marks]

$2\frac{3}{4} \rightarrow \frac{11}{4}$ $1\frac{5}{7} \rightarrow \frac{12}{7}$

$\frac{11}{4} \times \frac{12}{7} = \frac{132}{28} = \frac{66}{14} = \frac{33}{7}$

$\frac{33}{7} = \frac{28}{7} + \frac{5}{7} = 4\frac{5}{7}$

Answer $4\ 5/7$

26 Solve $5x - 2 > 3x + 11$

[2 marks]

$5x - 2 > 3x + 11$

$2x > 13$

$x > 13/2$

$x > 6.5$

Answer $x > 6.5$

Turn over for the next question

27 The nth term of a sequence is $2n + 1$

The nth term of a different sequence is $3n - 1$

Work out the **three** numbers that are

in both sequences

and

between 20 and 40

[3 marks]

Sequence 1 → 21, 23, 25, 27, 29, 31, 33, 35, 37, 39

Sequence 2 → 20, 23, 26, 29, 32, 35, 38

23, 29 and 35

Answer 23 , 29 , 35

28 White paint costs £2.80 per litre.
Blue paint costs £3.50 per litre.
White paint and blue paint are mixed in the ratio 3 : 2

Work out the cost of 18 litres of the mixture.

[4 marks]

W : B
3 : 2 → Total 3+2 = 5 parts of 18 Litres

$\frac{18}{5} = \frac{36}{10} = 3.6$ litre per part

W : B
3 × 3.6L : 2 × 3.6L
10.8L : 7.2L

White paint cost → 10.8 × £2.80 = (10 × 2.8) + (0.8 × 2) + (0.8 × 0.8)
28 + 1.6 + 0.64
= £28 + 2.24 = £30.24

Blue paint cost → 7.2 × 3.5 = (7 × 3) + (0.2 × 3) + (7.2 × 0.5)
21 + 0.6 + 3.6
= 21 + 4.2 = £25.20

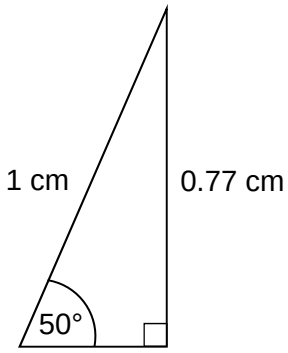
Total cost → 30.24 + 25.20
= £55.44

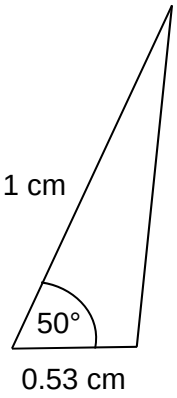
Answer £ 55.44

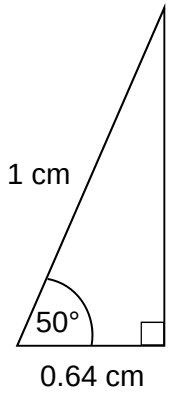
Turn over for the next question

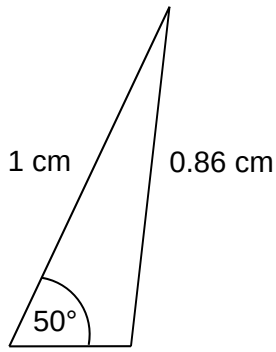
29 Here are sketches of four triangles.

Not drawn accurately









In each triangle

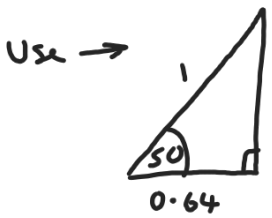
the longest side is **exactly** 1 cm

the other length is given to 2 decimal places.

29 (a) Circle the value of cos 50° to 2 decimal places.

[1 mark]

0.77 0.53 0.64 0.86

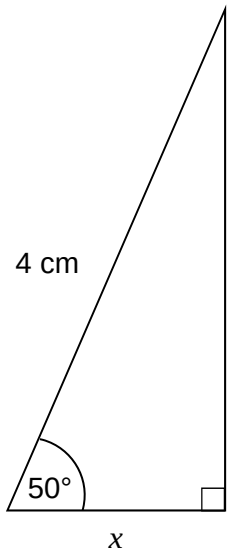


COS = CAH

$\cos 50 = \frac{0.64}{1} = 0.64$

29 (b) Work out the value of x.

Give your answer to 1 decimal place.



Not drawn accurately

[2 marks]

$\cos 50 = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{x}{4}$

$0.64 = \frac{x}{4} \rightarrow 0.64 \times 4 = x$

$(0.60 \times 4) + (0.04 \times 4)$

$2.4 + 0.16 = 2.56$

$= 2.6$

Answer 2.6 cm

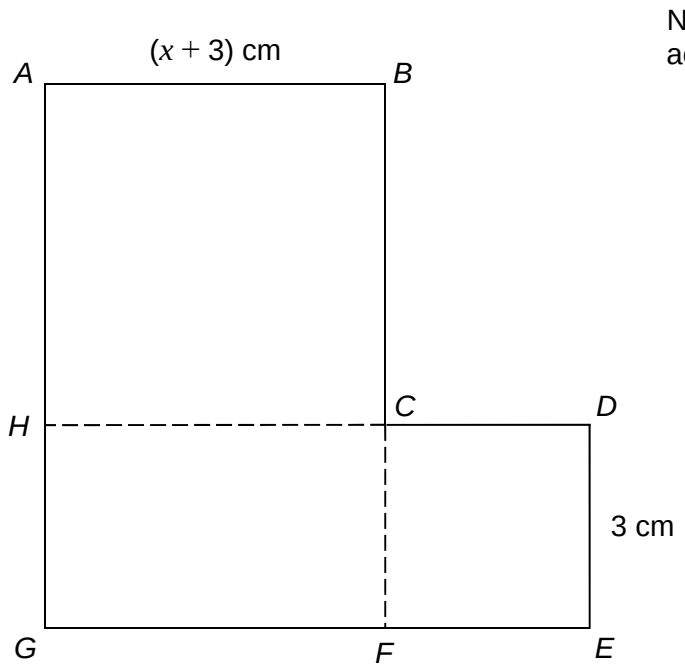
Turn over for the next question

30 *ABCH* is a square.

HCFG is a rectangle.

CDEF is a square.

They are joined to make an L-shape.



Show that the total area of the L-shape, in cm^2, is $x^2 + 9x + 27$

[4 marks]

Area ABCH → $(x+3)(x+3) = x^2+6x+9$

Area HCFG → $3(x+3) = 3x+9$

Area CDEF → $3 \times 3 = 9\ cm^2$

Total area → $x^2+6x+9+3x+9+9$

$= x^2+9x+27$

END OF QUESTIONS

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