AQA *Model Solutions*

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

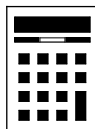# GCSE
MATHEMATICS

F

Foundation Tier   Paper 3 Calculator

Monday 12 November 2018   Morning   Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- a calculator
- mathematical instruments.

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.
- 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	
26–27	
TOTAL	

8300/3F

Do not write outside the box

Answer all questions in the spaces provided

1 Add 8 mm to 7 cm

Circle your answer.

8mm = 0.8cm

÷10

[1 mark]

150 mm   1.5 cm   (7.8 cm)   708 mm

7 + 0.8 = 7.8cm

2 In a pie chart, one sector represents $\frac{1}{4}$ of the data.

What is the angle of that sector?

Circle your answer.

full circle = 360° $\frac{1}{4}$ × 360° = 90°

[1 mark]

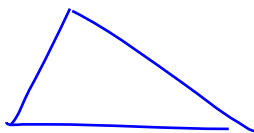4°   25°   45°   (90°)

3 Which of these **cannot** be the number of lines of symmetry of a triangle?

Circle your answer.

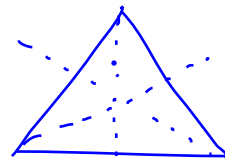**[1 mark]**

0   1   (2)   3

Do not write outside the box

4 Circle the fraction equal to 0.12

[1 mark]

$$\frac{1}{12} \qquad \boxed{\frac{3}{25}} \qquad \frac{1}{8} \qquad \frac{6}{5}$$

$0.12 = \dfrac{12}{100} = \dfrac{3}{25}$

5 (a) Solve $n + 7 = 103$

[1 mark]

$-7 (n + 7 = 103) -7$

$n = 96$

$n = \underline{\quad 96 \quad}$

5 (b) Solve $\dfrac{m}{6} = 12$ ×6

[1 mark]

$\dfrac{m}{6} = 12$

×6 $m = 6 \times 12$ ×6 $= 72$

$m = \underline{\quad 72 \quad}$

Turn over for the next question

6

Turn over ▶

IB/M/Nov18/8300/3F

6   Here is a plan of a flat with four rectangular rooms.

$8 \div 2 = 4cm$ $12 \div 2 = 6cm$

8 feet   12 feet   Not drawn accurately

$6 \div 2 = 3$
3cm

6 feet   Bathroom   Kitchen   8 feet $8 \div 2 = 4cm$

$10 \div 2 = 5$
5cm

10 feet   Bedroom   Living room   14 feet $14 \div 2 = 7cm$
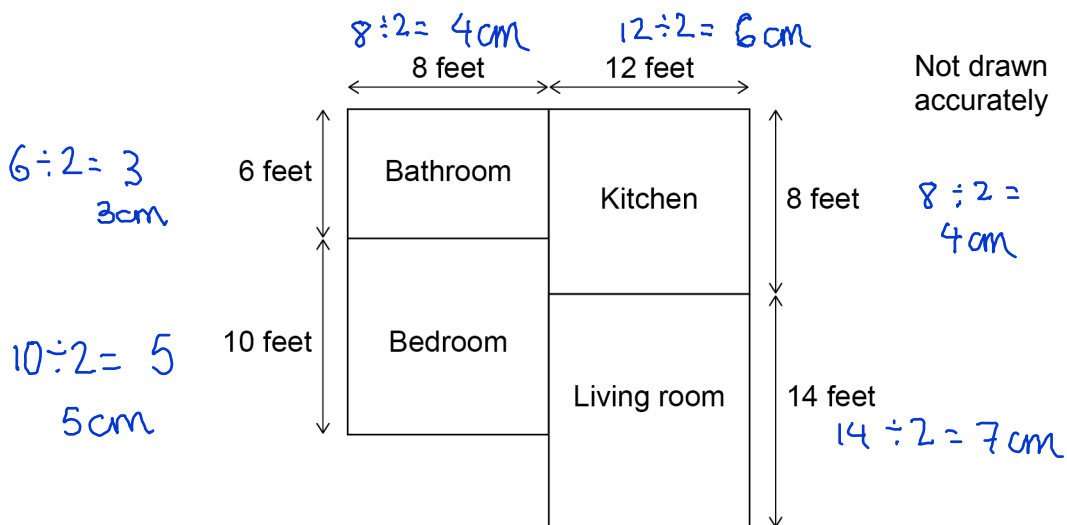
On the grid on the opposite page, make an accurate scale drawing of the plan.

Label each room.

Use a scale of   1 cm represents 2 feet

[3 marks]

Scale: 1 cm represents 2 feet

Bathroom

Kitchen

Bedroom

Living room

3

Turn over ▶

0 5
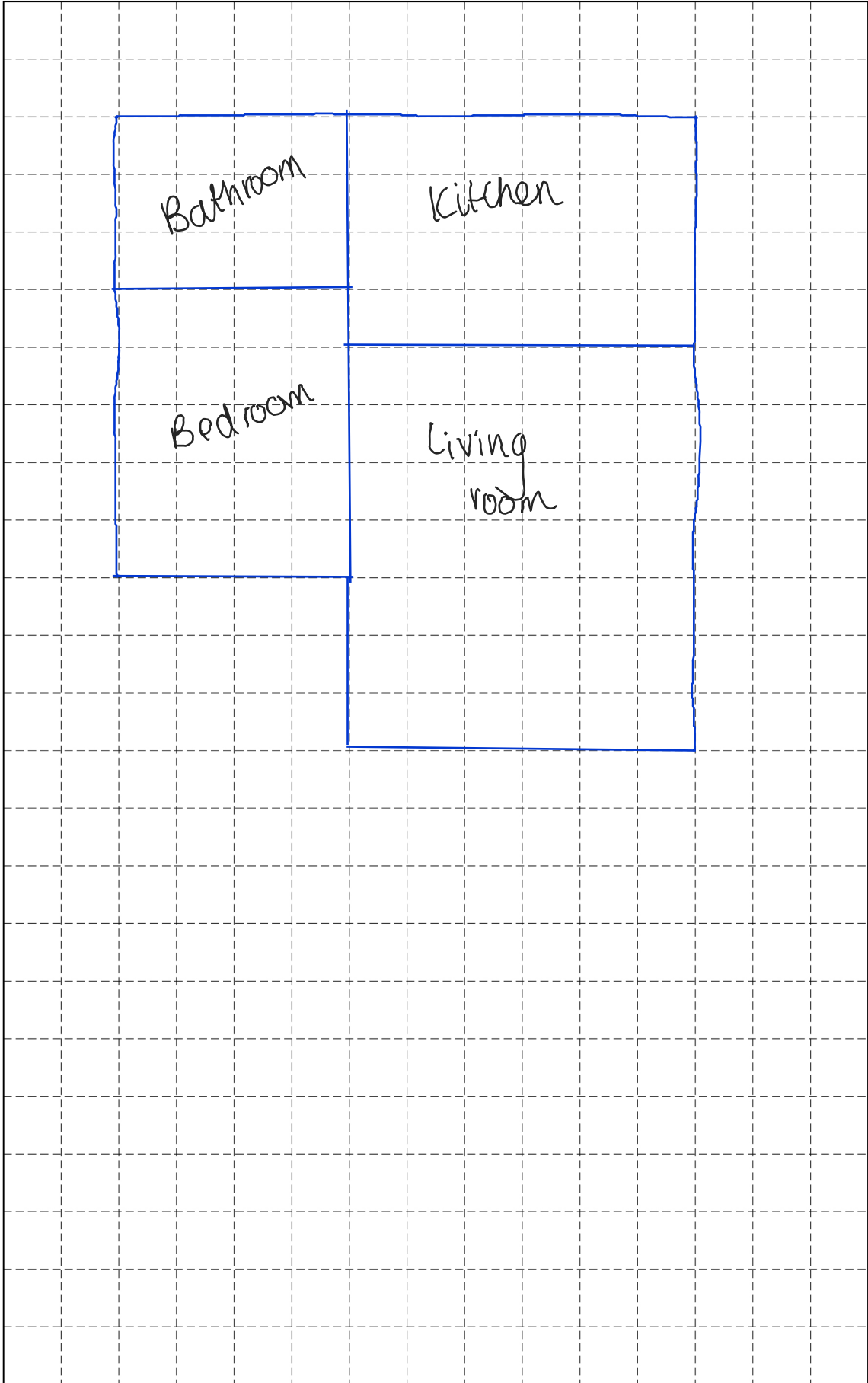
7 Here are two groups of numbers, A and B.

Group A

19	11
14	32
16	9

Group B

31	18
28	12

One number is moved from A to B.

The sum of the numbers in B is now 20 **more** than the sum of the numbers in A.

Which number is moved?

You **must** show your working.

[3 marks]

Sum of A: 19 + 11 + 14 + 32 + 16 + 9 = 101
Sum of B: 31 + 28 + 18 + 12 = 89

when 16 is taken out:
Sum of A: 85) +20
of B: 105)

Answer ____16____

Do not write outside the box

8 Beth sells hot dogs at a market.

Each hot dog is a sausage in a bread roll.

Hot dogs
£3 each

The table shows her costs.

Fee paid to market	£240
Bread rolls	42p per pack of 6
Sausages	£2.50 per jar of 10
Other costs	£57

Beth sells the hot dogs for £3 each.

She sells 300 hot dogs.

Work out her <u>total profit.</u>

[5 marks]

Bread rolls : 300 ÷ 6 = 50 packs
Sausages : 300 ÷ 10 = 30 jars

Costs :   240
(Bread) 50 × 0.42   21   +
(Saus) 30 × 2.5   75
                    57
                   393

Revenue : 3 × 300 = 900
Profit = 900 − 393

Answer £ _____507_____

8

Turn over ▶

9 A company sells houses.

The line graph shows the number sold per week for 30 weeks.

Houses sold

24

15

9

6

2

Number of weeks

Number of houses

1
0

1
5

9 (a) Work out the <u>range</u> of the number of houses sold per week.

biggest - smallest

[2 marks]

5 - 0 = 5

Answer   5

9 (b) Work out the <u>median number</u> of houses sold per week.

middle

[2 marks]

$\frac{30+1}{2}$ = 15.5 or 16th value

Between 3 and 4.

Answer   3.5

9 **(c)** The company sells three houses.

The prices are £185 000, £239 000 and £136 000

The company earns 2% commission on each house.

In total, how much commission does the company earn on these three houses?

[3 marks]

Total: 185 000 + 239 000 + 136 000

= 560 000

(0·02) 2% of 560 000

(0·02) × 560000 = 11 200

Answer £ 11200

Turn over for the next question

7

Turn over ▶

Do not write outside the box

10   In a game, a fair spinner has five equal sections as shown.
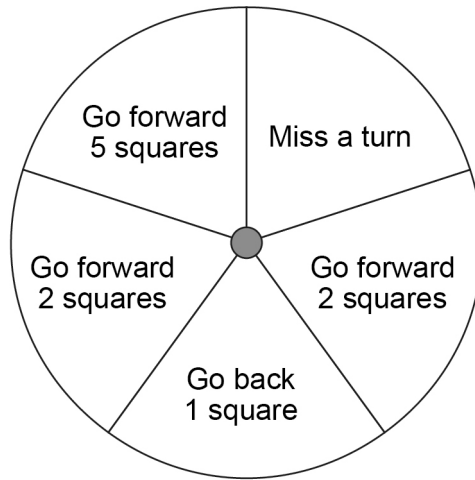
10 (a)   Chloe spins the spinner.

Write down the probability that she gets 'Miss a turn'.

[1 mark]

Answer   1/5

10 (b)   The spinner lands on 'Go back 1 square' three times in a row. *– irrelevant information*
Jamal is next to spin.

Write down the probability that he gets 'Go back 1 square'.

[1 mark]

Answer   1/5

10 (c)   In one game there are 85 spins.

How many of these spins are expected to be 'Go forward 2 squares'?

[2 marks]

$P(\text{Go forward 2}) = 2/5$

$2/5 \times 85 = 34$

Answer _____34_____

11   Circle the cube number.

[1 mark]

9   10 000   333   (729)

$9 \times 9 \times 9$

12   How many minutes is 225 seconds?

Circle your answer.

$225 \div 60 = 3\,^{3}/4$

[1 mark]

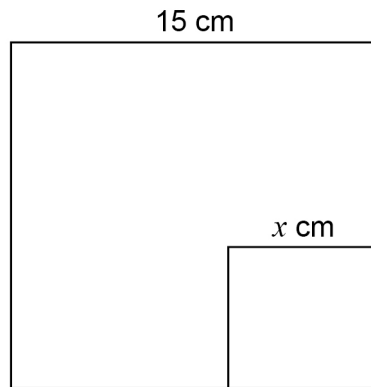$2\dfrac{5}{12}$ $2\dfrac{1}{4}$ $3\dfrac{1}{4}$ $\left(3\dfrac{3}{4}\right)$

6

Turn over ▶

13 A small square has length x cm

A large square has length 15 cm

15 cm

Not drawn accurately

x cm

The area of the small square is $\dfrac{1}{9}$ of the area of the large square.

Work out the value of x.

[3 marks]

Area of 15cm square = 15 × 15 = 225
Area of x cm square = $x \times x = x^2$
$\frac{1}{9} \times 225 = x^2$

$\sqrt{25}$ ($25 = x^2$) $\sqrt{x^2}$
$5 = x$

Answer ___5 cm___

Do not write outside the box

14 (a) The term-to-term rule of a sequence is

Add 8 and divide by 2

The first term of the sequence is −24

Work out the next two terms.

[2 marks]

① $-24 + 8 = -16$
$-16 \div 2 = -8$

② $-8 + 8 = 0$
$0 \div 2 = 0$

Answer _____ −8 _____ and _____ 0 _____

14 (b) The term-to-term rule of a different sequence is

Subtract 1 and multiply by 5

Backwards:
− divide 5
add 1

The third term of this sequence is 120

...6.   25   120

Work out the first term.

[2 marks]

$120 \div 5 = 24$
$24 + 1 = 25$

$25 \div 5 = 5$
$5 + 1 = 6$
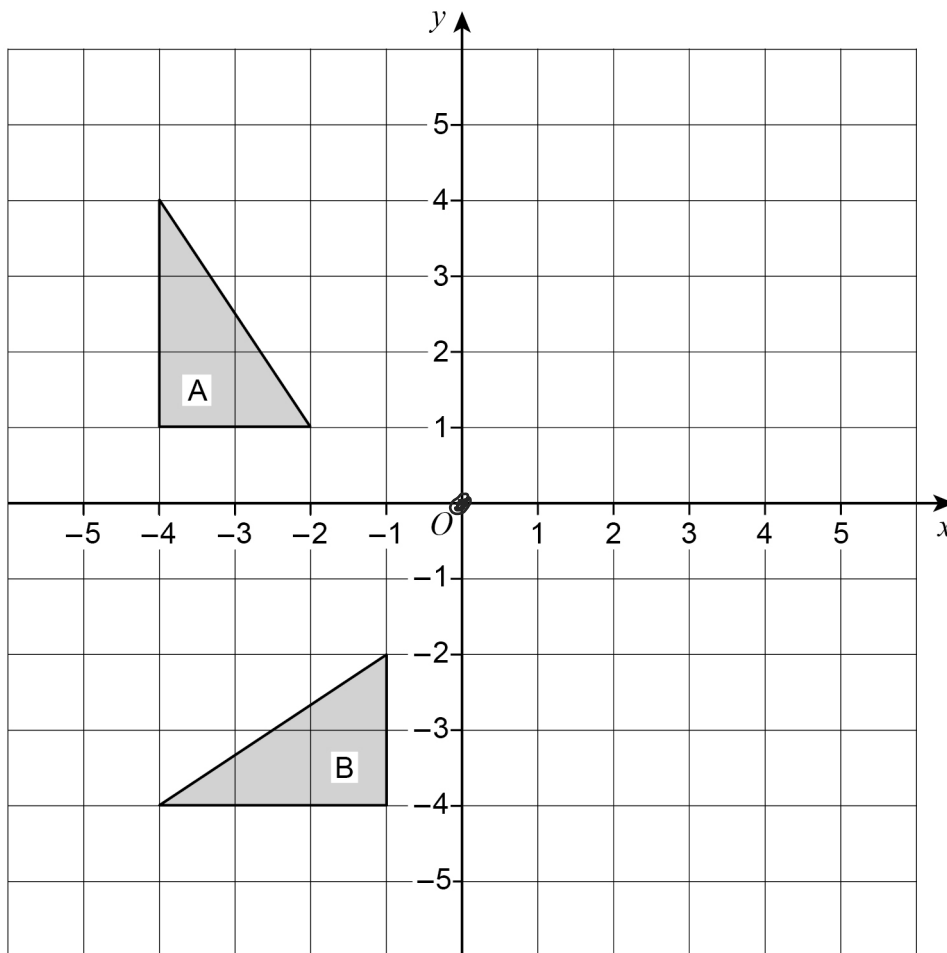
Answer _____ 6 _____

7

Turn over ▶

15 Describe fully the **single** transformation that maps shape A to shape B.

[3 marks]

Rotation, 90° anticlockwise about (0,0)

Do not write outside the box

16   Amal drives her car for work.

She claims 40p per mile from her employer.

Amal's car travels 52 miles for each gallon of petrol.
She pays £5.36 per gallon for petrol.

On one journey Amal drives 260 miles.

For this journey, how much **more** does she claim than she pays for petrol?

[4 marks]

Amal drives: 260 miles

She uses : 260 ÷ 52 = 5 gallon

She pays: 5 × 5.36 = £26.80

She claims   40p per mile (£0.40)

This is   0.4 × 260 = £104

Difference : 104 − 26.80
        =   £77.20

Answer £ _77.20_

Turn over for the next question

7

Turn over ▶

Do not write outside the box

17 Here is a map of Cuba.

1.5 cm represents 200 km

Havana

4.5 cm
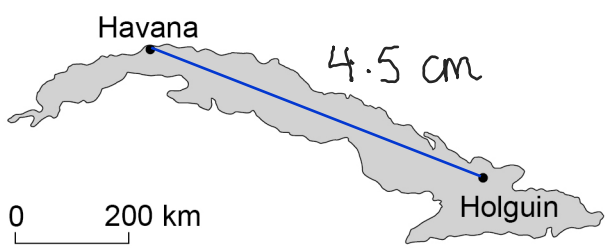
0   200 km

Holguin

Work out the actual distance from Havana to Holguin.

[3 marks]

1.5cm : 200km   )x3

x3 ⤷ 4.5cm : 600km ⤦ ×3

Answer _____600_____ km

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Do not write outside the box

18 Four friends all give each other presents.

The total cost of the presents is £83.40

Work out the mean cost of a present.

[3 marks]

$$\text{Mean} = \frac{\text{Total}}{\text{Freq}}$$

Each friend gives 3 presents

$4 \times 3 = 12$ presents bought

$$\text{mean} = \frac{83.40}{12}$$

Answer £ __6.95__

Turn over for the next question

6

Turn over ▶

IB/M/Nov18/8300/3F

19   A forest has 6500 trees.

The trees are beech or maple.

number of beech : number of maple = 1.6 : 1

19 (a)   What fraction of the trees are beech?

[2 marks]

$$\text{Fraction} = \frac{1.6}{1+1.6} = \frac{1.6}{2.6} = \frac{8}{13}$$

number of beech

total number of trees

Answer $\frac{8}{13}$

19 (b)   Write   number of beech : number of maple   in the form   1 : n

[1 mark]

$$1.6 : 1$$
$$\div 1.6 \left(\right) \div 1.6$$
$$1 : \frac{5}{8}$$

Answer 1 : $\frac{5}{8}$

Do not write outside the box

20 A shape is translated by the vector $\begin{pmatrix} 0 \\ 4 \end{pmatrix}$ 4 up

In which direction does the shape move?

Circle your answer.

[1 mark]

~~up~~   down   left   right

21 The length of a table is 110 cm to the nearest cm

Complete the error interval.

[2 marks]

all values round to 110cm

_109.5_ cm ⩽ length < _110.5_ cm

Turn over for the next question

6

Turn over ▶

IB/M/Nov18/8300/3F

Do not write outside the box

22 $k = n^2 + 9n + 1$

Mo says,

"k will be a prime number for all integer values of n from 1 to 9"

Show that Mo is wrong.

You **must** show that your value of k is **not** prime.

[3 marks]

when n = 7

k = 7² + 9(7) + 1 = 113   prime

when n = 6
k = 6² + 9(6) + 1
  =   91

91 ÷ 13 = 7

91 is not prime.

23 At a café,

$\qquad$ 2 teas and 1 coffee cost £3.40   1

$\qquad$ 1 tea and 4 coffees cost £7.30   2

Work out the cost of 1 tea and the cost of 1 coffee.

[4 marks]

① $2t + c = 3.4$

② $t + 4c = 7.3$

②×2 $2t + 8c = 14.6$

① $2t + c = 3.4$

$\qquad 7c = 11.2$

$\qquad c = 1.6$

sub into ②

$\qquad t + 4(1.6) = 7.3$

$\qquad t + 6.4 = 7.3$

$\qquad t = 0.9$

Tea   **£0.90**

Coffee   **£1.60**

Turn over for the next question

7

24 A music festival has taken place each year from 2011

The table shows the number of people who attended each year.

Year	2011	2012	2013	2014	2015	2016	2017	2018
Number of people	350	583	906	1471	2023	2612	3251	3780

The festival organisers draw a time series graph to represent the data.

The first four years have been plotted.

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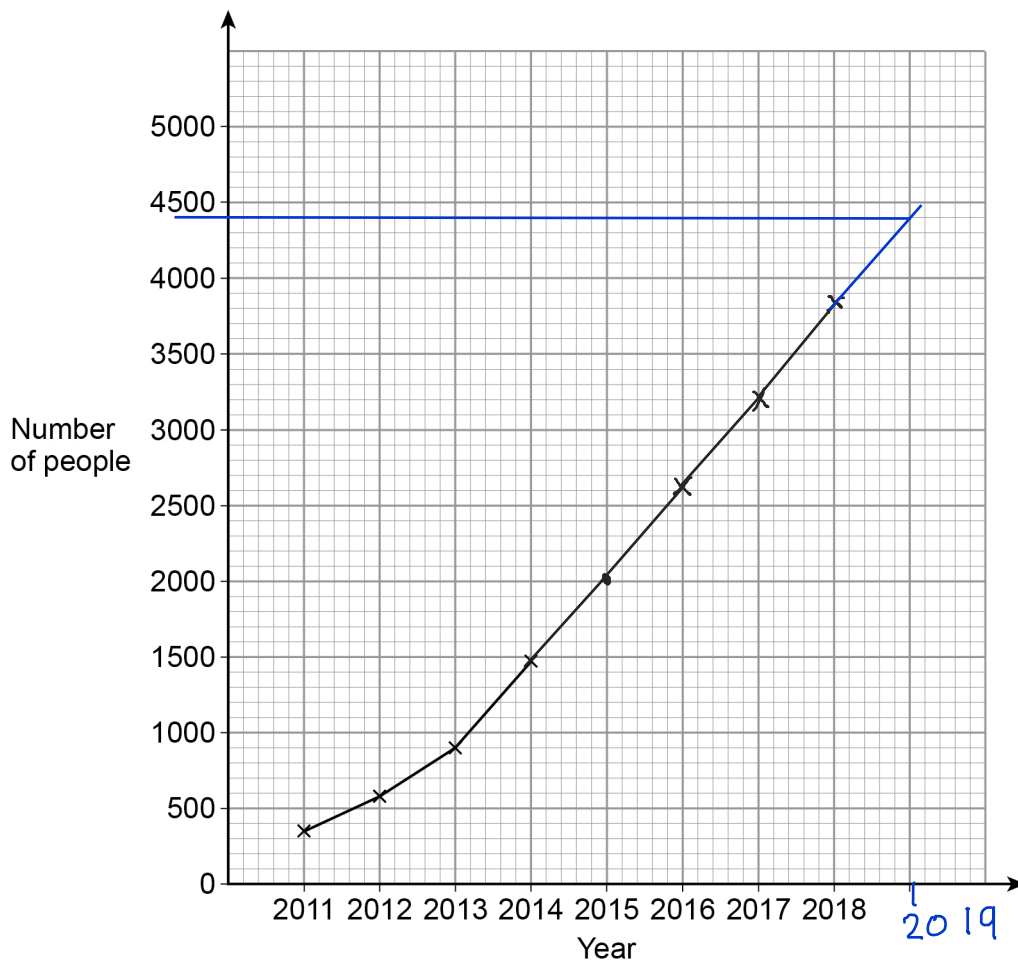
24 (a) Complete the graph.

[2 marks]

24 (b) Use the graph to estimate the number of people who will attend the festival in 2019

[2 marks]

Show working on graph.

Answer _____ 4 400 _____

Turn over for the next question

4

Turn over ▶

Do not write outside the box

25   Doug owes an amount of £600

He wants to pay back this amount in five months.

He says, $1 - 20\% = 80\%$

     "Each month, I will pay back <u>20%</u> of the amount I still owe."

Show working to check if his method is correct.

[3 marks]

① $600 \times 0.8 = 480$

② $480 \times 0.8 = 384$

③ $384 \times 0.8 = 307.2$

④ $307.2 \times 0.8 = 245.76$

⑤ $245.76 \times 0.8 = 196.608$

After month 5, £196.61 is still owed

The method is incorrect.

Do not write outside the box

26   Here is a quadratic graph.
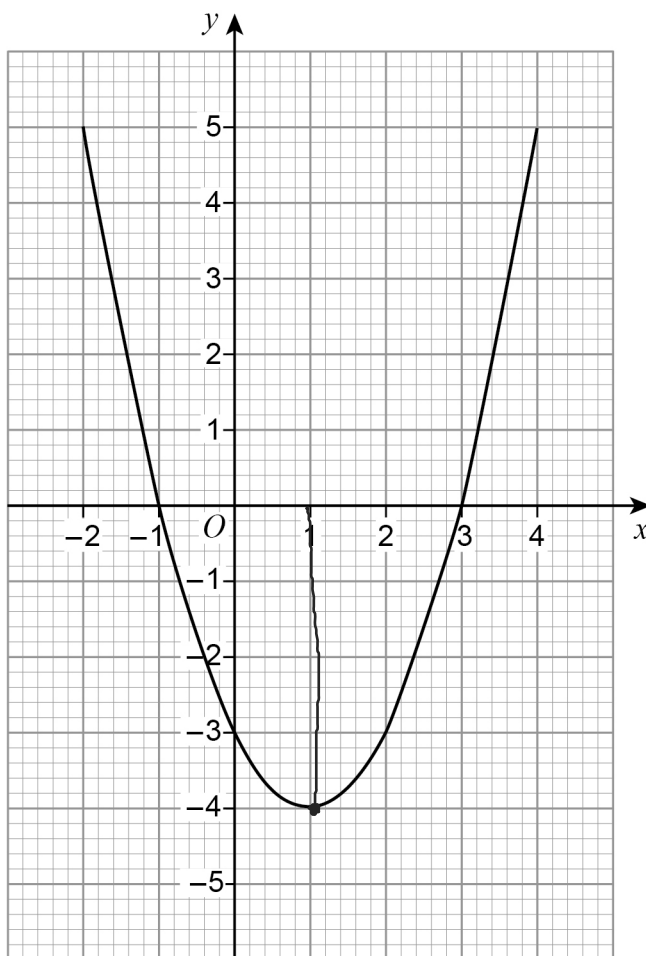
Circle the x-coordinate of the turning point of the graph.

[1 mark]

     −4   −1   ①   3

Turn over for the next question

4

Turn over ▶

27 A motor racing circuit consists of

two parallel straight sections, each of length 0.75 km

a semicircle of diameter 0.9 km

three equal, smaller semicircles.

Not drawn accurately
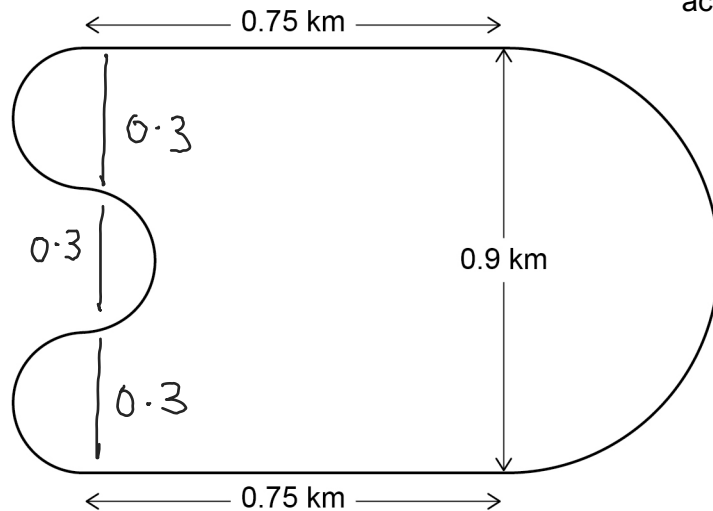
The length of a motor race must be greater than 305 km

What is the lowest number of **full** laps needed at this circuit?

You **must** show your working.

[5 marks]

Circumference of large semicircle: $\dfrac{\pi \times 0.9}{2} = 0.45\pi$

Circumference of 3 small semi: $3 \times \dfrac{\pi \times 0.3}{2} = 0.45\pi$

Total Perimeter: $0.45\pi + 0.45\pi + 0.75 + 0.75$
$= 4.3274\ldots$ km

Total number of laps: $305 \div 4.3274\ldots = 70.48\ldots$

round up

Answer ___71___

28 Solve $\quad 8 > 3 - \dfrac{1}{2}x$

$+\frac{1}{2}x$

[2 marks]

$$8 + \frac{1}{2}x > 3$$
$$-8$$
$$\frac{1}{2}x > -5$$
$$\times 2$$

Answer $\qquad x > -10 \qquad$

29 Use trigonometry to work out the size of angle x.

[2 marks]

Not drawn accurately

10 cm

x

9 cm
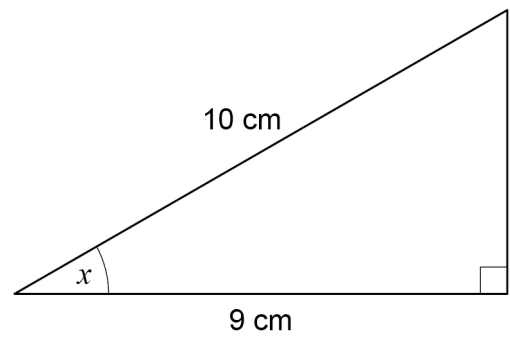
$$\cos \theta = \frac{adj}{hyp}$$

$$\cos x = \frac{9}{10}$$

$$x = \cos^{-1}(0.9) = 25.84\ldots$$

Answer $\qquad 25.8 \qquad$ degrees

(3 sf)

END OF QUESTIONS

9

There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED