Please write clearly in block capitals.

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

Surname StemUp Model Solution

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	

Do not write outside the box

Answer **all** questions in the spaces provided

1 Add 8 mm to 7 cm

Circle your answer.

[1 mark]

150 mm 1.5 cm 7.8 cm 708 mm

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

What is the angle of that sector?

Circle your answer.

[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]

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

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

[1 mark]

$n = 103 - 7$

$n =$ 96

5 (b) Solve $\frac{m}{6} = 12$

[1 mark]

$m = 12 \times 6$

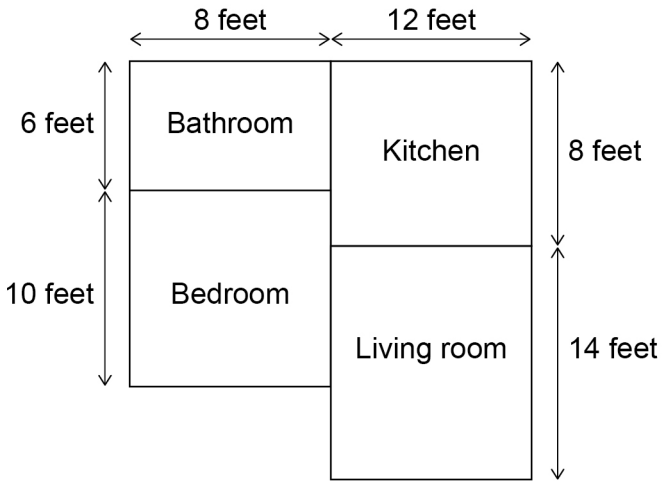
$m =$ 72

Turn over for the next question

6

Do not write outside the box

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



Not drawn accurately

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 = 2 feet, so divide each length by 2:

Bathroom: 8 ft × 6 ft → 4 cm × 3 cm

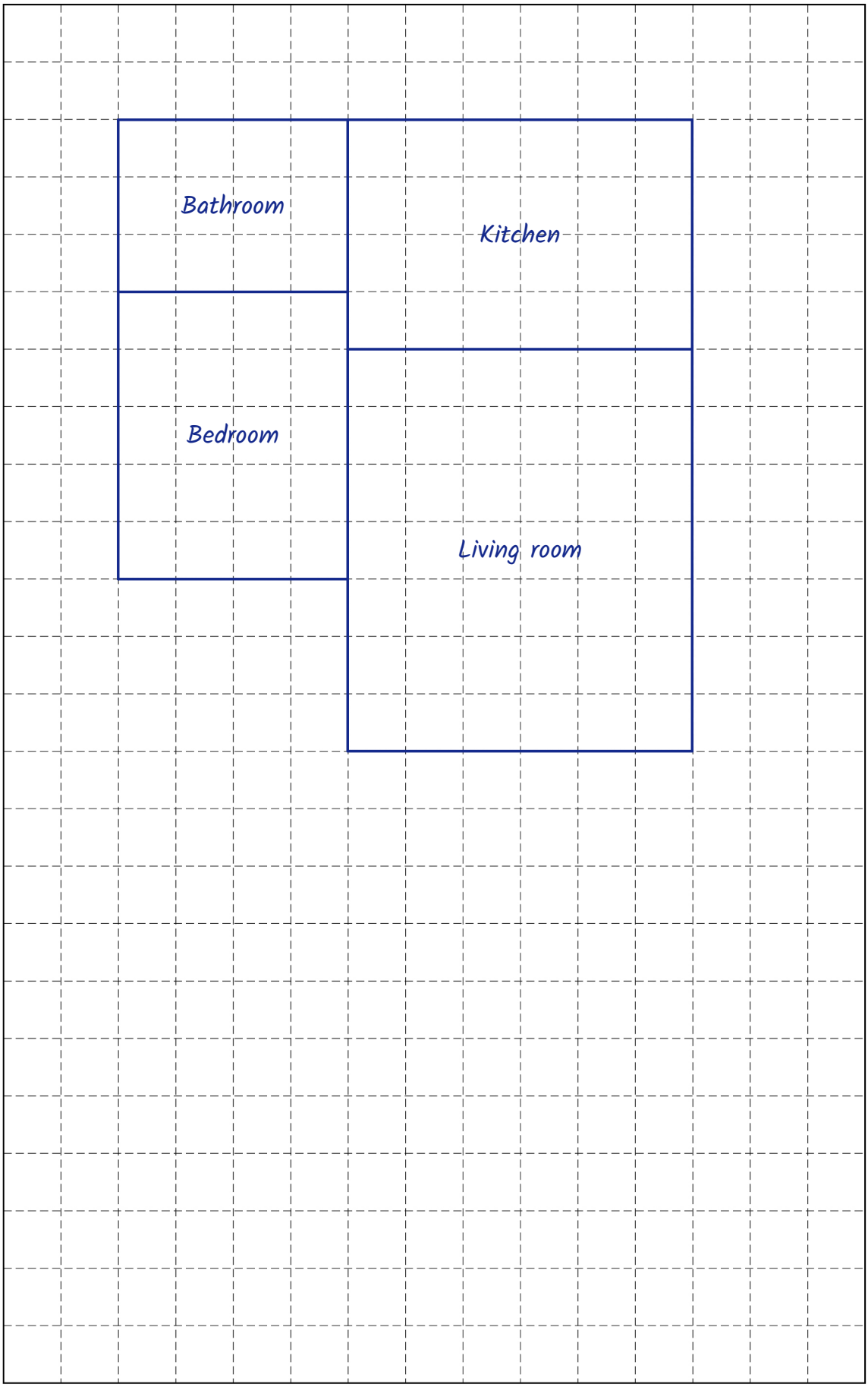
Bedroom: 8 ft × 10 ft → 4 cm × 5 cm

Kitchen: 12 ft × 8 ft → 6 cm × 4 cm

Living room: 12 ft × 14 ft → 6 cm × 7 cm

Do not write outside the box

Scale: 1 cm represents 2 feet



3

Turn over ►

Do not write outside the box

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 + 18 + 28 + 12 = 89

Total = 101 + 89 = 190

After the move: A = (190 − 20) ÷ 2 = 85, B = (190 + 20) ÷ 2 = 105

Number moved = 101 − 85 = 16

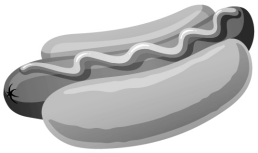
Check: 89 + 16 = 105 and 105 − 85 = 20

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 total profit.

[5 marks]

Sales = 300 × £3 = £900

Bread rolls: 300 ÷ 6 = 50 packs, 50 × 42p = 2100p = £21

Sausages: 300 ÷ 10 = 30 jars, 30 × £2.50 = £75

Total costs = 240 + 21 + 75 + 57 = £393

Profit = 900 − 393 = £507

Answer £ 507

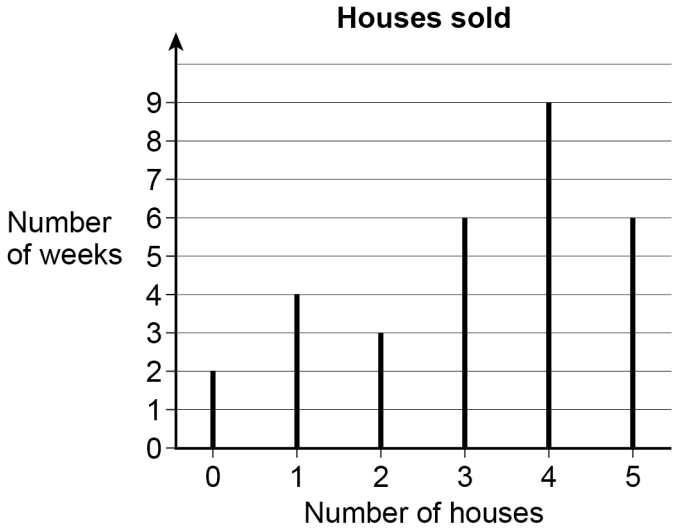
8

Turn over ►

Do not write outside the box

9 A company sells houses.

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



9 (a) Work out the range of the number of houses sold per week.

[2 marks]

Largest number of houses = 5, smallest = 0

Range = 5 − 0 = 5

Answer 5

9 (b) Work out the median number of houses sold per week.

[2 marks]

30 weeks, so the median is between the 15th and 16th values

Cumulative: 2, 6, 9, 15, 24, 30. 15th = 3, 16th = 4, (3 + 4) ÷ 2 = 3.5

Answer 3.5

Do not write outside the box

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

2% = 0.02

Commission = 560 000 × 0.02 = £11 200

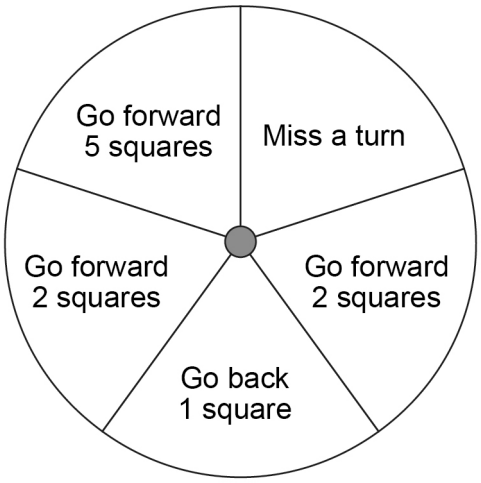
Answer £ 11 200

Turn over for the next question

7

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 $\frac{1}{5}$

10 (b) The spinner lands on 'Go back 1 square' three times in a row.

Jamal is next to spin.

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

[1 mark]

Answer $\frac{1}{5}$

Do not write outside the box

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(Go forward 2 squares) = $\frac{2}{5}$

$\frac{2}{5} \times 85 = 85 \div 5 \times 2 = 34$

Answer 34

11 Circle the cube number.

[1 mark]

9 10 000 333 729

12 How many minutes is 225 seconds?

Circle your answer.

[1 mark]

$2\frac{5}{12}$ $2\frac{1}{4}$ $3\frac{1}{4}$ $3\frac{3}{4}$

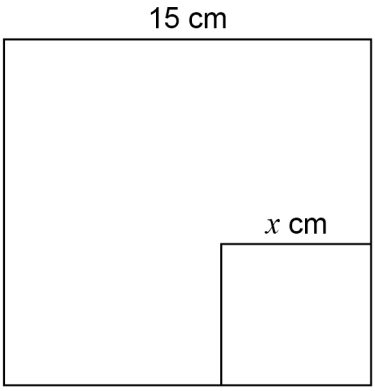
6

Turn over ►

Do not write outside the box

13 A small square has length x cm

A large square has length 15 cm



Not drawn accurately

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

Work out the value of x.

[3 marks]

Area of large square = 15^2 = 225 cm^2

Area of small square = 225 ÷ 9 = 25 cm^2

$x = \sqrt{25} = 5$

Answer 5

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]

$(-24 + 8) \div 2 = -16 \div 2 = -8$

$(-8 + 8) \div 2 = 0 \div 2 = 0$

Answer -8 and 0

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

Subtract 1 and multiply by 5

The third term of this sequence is 120

6 ..... 25 120

Work out the first term.

[2 marks]

Work backwards: $\div 5$ then $+ 1$

2nd term $= 120 \div 5 + 1 = 24 + 1 = 25$

1st term $= 25 \div 5 + 1 = 5 + 1 = 6$

Check: $(6 - 1) \times 5 = 25$, $(25 - 1) \times 5 = 120$

Answer 6

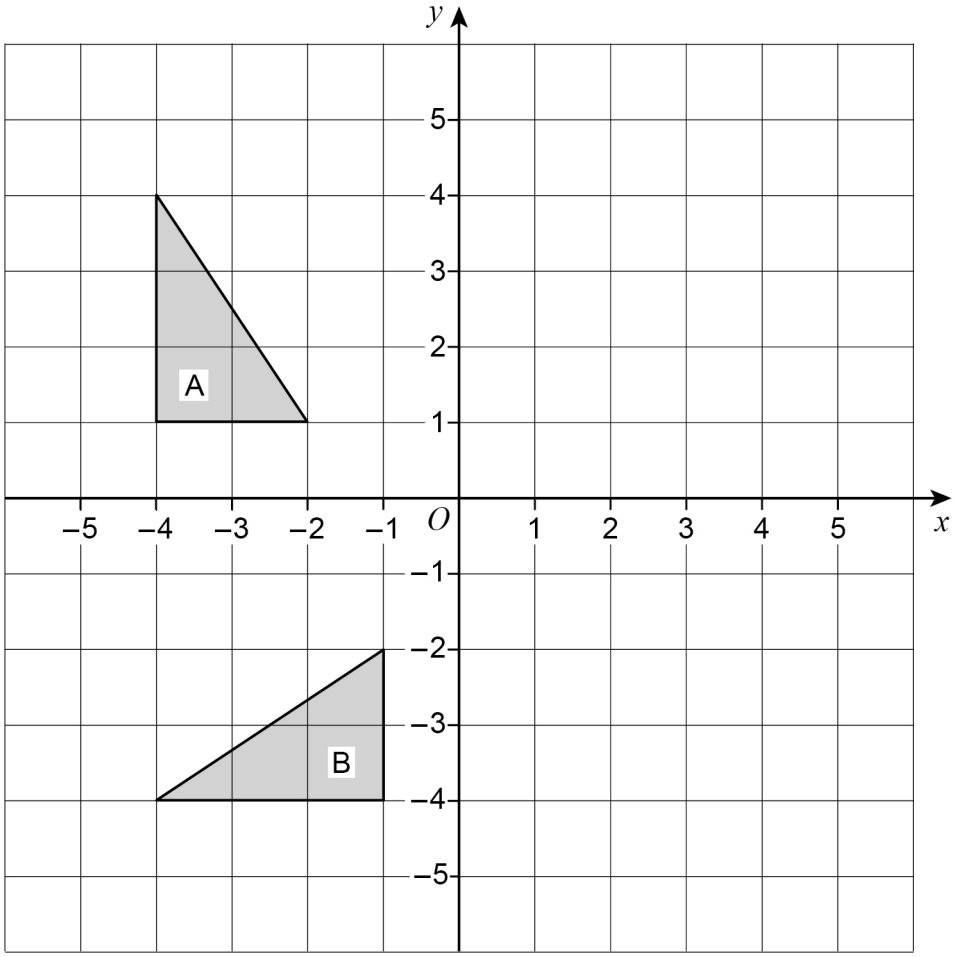
7

Turn over ►

Do not write outside the box

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

[3 marks]



Rotation, 90° anticlockwise,

about the origin (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]

Claim = 260 × £0.40 = £104

Petrol used = 260 ÷ 52 = 5 gallons

Cost of petrol = 5 × £5.36 = £26.80

Difference = 104 − 26.80 = £77.20

Answer £ 77.20

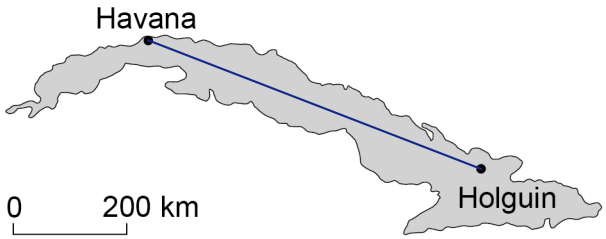
Turn over for the next question

7

Do not write outside the box

17 Here is a map of Cuba.

1.5 cm represents 200 km



Work out the actual distance from Havana to Holguin.

[3 marks]

Havana to Holguin on the map = 4.7 cm

4.7 ÷ 1.5 = 3.1333...

3.1333... × 200 = 626.66... ≈ 627 km

Answer 627 km

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]

Each friend gives 3 presents, so 4 × 3 = 12 presents

Mean = 83.40 ÷ 12 = 6.95

Answer £ 6.95

Turn over for the next question

6

Do not write outside the box

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]

1.6 : 1 = 16 : 10 = 8 : 5

Total parts = 8 + 5 = 13

Beech = 8 out of 13 parts (6500 ÷ 13 × 8 = 4000 beech)

Answer $\frac{8}{13}$

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

[1 mark]

1.6 : 1 = (1.6 ÷ 1.6) : (1 ÷ 1.6) = 1 : 0.625

Answer 1 : 0.625

Do not write outside the box

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

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]

109.5 cm $\leqslant$ length $<$ 110.5 cm

Turn over for the next question

6

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]

$n = 1$: $k = 1 + 9 + 1 = 11$ (prime)

$n = 2$: $k = 4 + 18 + 1 = 23$ (prime)

$n = 3$: $k = 9 + 27 + 1 = 37$ (prime)

$n = 4$: $k = 16 + 36 + 1 = 53$ (prime)

$n = 5$: $k = 25 + 45 + 1 = 71$ (prime)

$n = 6$: $k = 36 + 54 + 1 = 91$

$91 \div 7 = 13$, so $91 = 7 \times 13$

91 has factors 7 and 13, so 91 is not prime.

So Mo is wrong: when $n = 6$, $k = 91$ is not a prime number.

Do not write outside the box

23 At a café,

2 teas and 1 coffee cost £3.40

1 tea and 4 coffees cost £7.30

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

[4 marks]

$2t + c = 3.40$ (1)

$t + 4c = 7.30$ (2)

(1) × 4: $8t + 4c = 13.60$ (3)

(3) − (2): $7t = 6.30$

$t = 0.90$

Sub into (1): $2 \times 0.90 + c = 3.40$

$c = 3.40 - 1.80 = 1.60$

Check (2): $0.90 + 4 \times 1.60 = 0.90 + 6.40 = 7.30$

Tea £0.90

Coffee £1.60

Turn over for the next question

7

Do not write outside the box

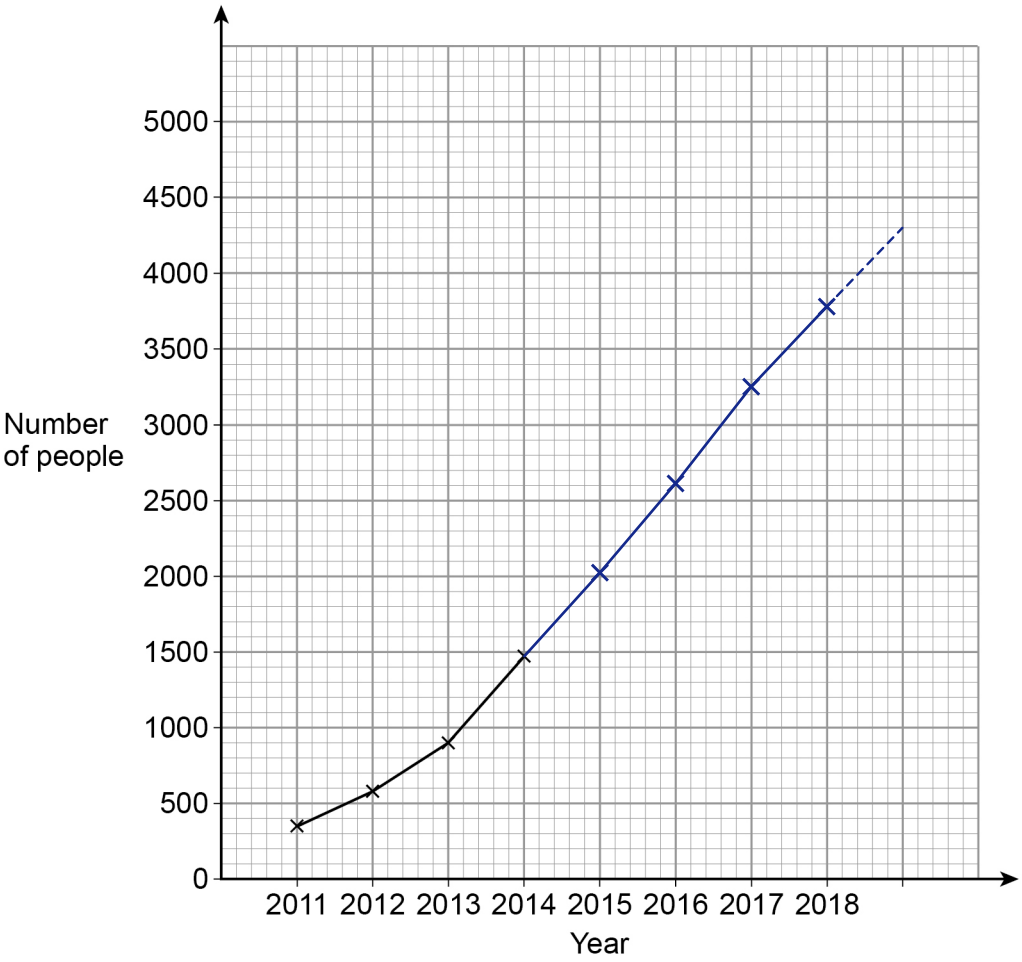
24 A music festival has taken place each year from 2011

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.



Do not write outside the box

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]

Increase 2017 to 2018 = 3780 − 3251 = 529

Continue the trend: 3780 + 529 = 4309 ≈ 4300

Answer 4300

Turn over for the next question

4

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,

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

Show working to check if his method is correct.

[3 marks]

Month 1: pays 0.2 × 600 = £120, still owes 600 − 120 = £480

Month 2: pays 0.2 × 480 = £96, still owes £384

Month 3: pays 0.2 × 384 = £76.80, still owes £307.20

Month 4: pays 0.2 × 307.20 = £61.44, still owes £245.76

Month 5: pays 0.2 × 245.76 = £49.152, still owes £196.608

(or $600 \times 0.8^5 = 196.608$)

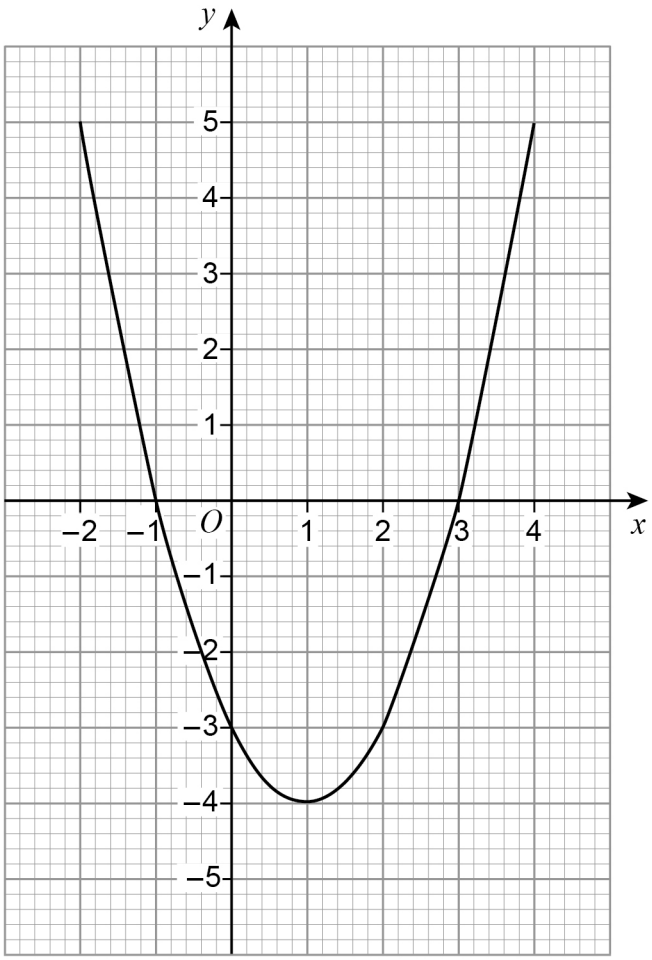
After five months he still owes £196.61

So his method is not correct: he will not have paid back

all £600 in five months.

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

Do not write outside the box

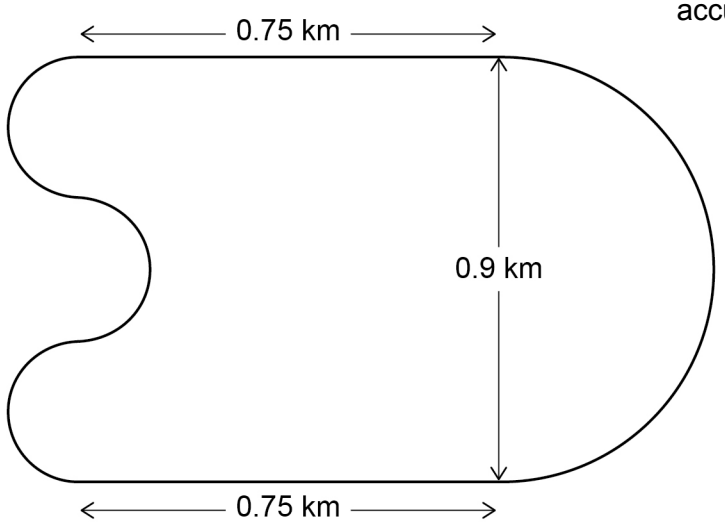
27 A motor racing circuit consists of

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]

Large semicircle = π × 0.9 ÷ 2 = 1.4137... km

Small semicircle diameter = 0.9 ÷ 3 = 0.3 km

Each small semicircle = π × 0.3 ÷ 2 = 0.4712... km

One lap = 2 × 0.75 + 1.4137... + 3 × 0.4712...

= 1.5 + 1.4137... + 1.4137... = 4.3274... km

Laps = 305 ÷ 4.3274... = 70.48...

70 laps = 302.9 km (not more than 305 km)

71 laps = 307.2 km (more than 305 km)

Answer 71

Do not write outside the box

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

[2 marks]

$\times 2$: $16 > 6 - x$

$16 - 6 > -x$

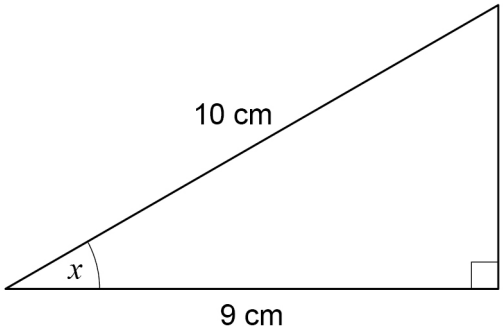
$10 > -x$

$x > -10$

Answer $x > -10$

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

[2 marks]



Not drawn accurately

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

$x = \cos^{-1}(9 \div 10)$

$x = 25.841932...$

$x = 25.8°$

Answer 25.8 degrees

END OF QUESTIONS

9

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There are no questions printed on this page

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