

Please write clearly in block capitals.

Centre number Candidate number

Surname _____

Forename(s) _____

Candidate signature _____

**GCSE
MATHEMATICS**

F

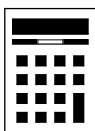
Foundation Tier Paper 3 Calculator

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.

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	

Advice

In all calculations, show clearly how you work out your answer.



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 indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

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

Anything written in orange in a rectangle doesn't have to be written in the exam and is there to show what should be put into a calculator or measured using a ruler or protractor.

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

- 1 Add 8 mm to 7 cm
Circle your answer.

[1 mark]

150 mm

1.5 cm

7.8 cm

708 mm

There are 10 millimetres in a centimetre. Convert the 8mm into centimetres then add it to 7cm

- 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°

There are 360° in total in a pie chart. Work out $\frac{1}{4}$ of this

- 3 Which of these **cannot** be the number of lines of symmetry of a triangle?
Circle your answer.

[1 mark]

0

1

2

3

Consider the number of lines of symmetry in the different types of triangle: scalene, isosceles and equilateral



4 Circle the fraction equal to 0.12

[1 mark]

$$\frac{1}{12}$$

$$\frac{3}{25}$$

$$\frac{1}{8}$$

$$\frac{6}{5}$$

Typing 0.12 into the calculator converts it into a fraction in it's simplest form

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

[1 mark]

Do the opposite of +7 to both sides to make n the subject

$$n = \underline{\hspace{2cm}}$$

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

[1 mark]

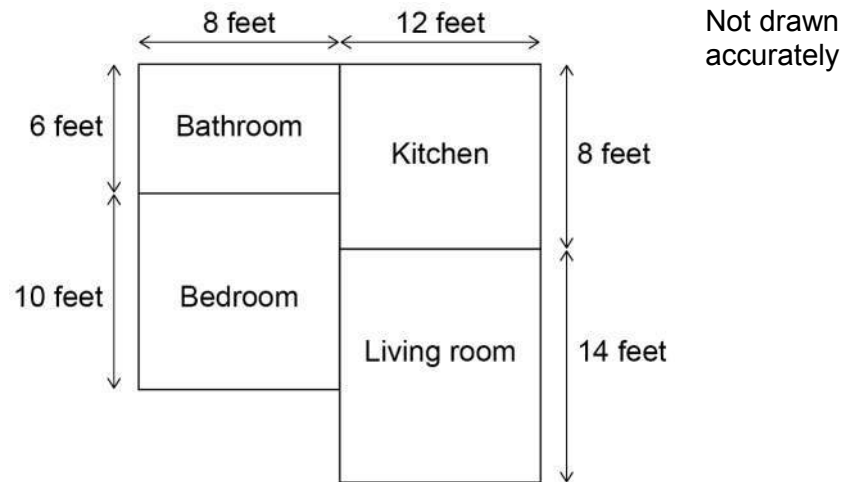
Do the opposite of dividing by 6 to both sides to make m the subject

$$m = \underline{\hspace{2cm}}$$

Turn over for the next question



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

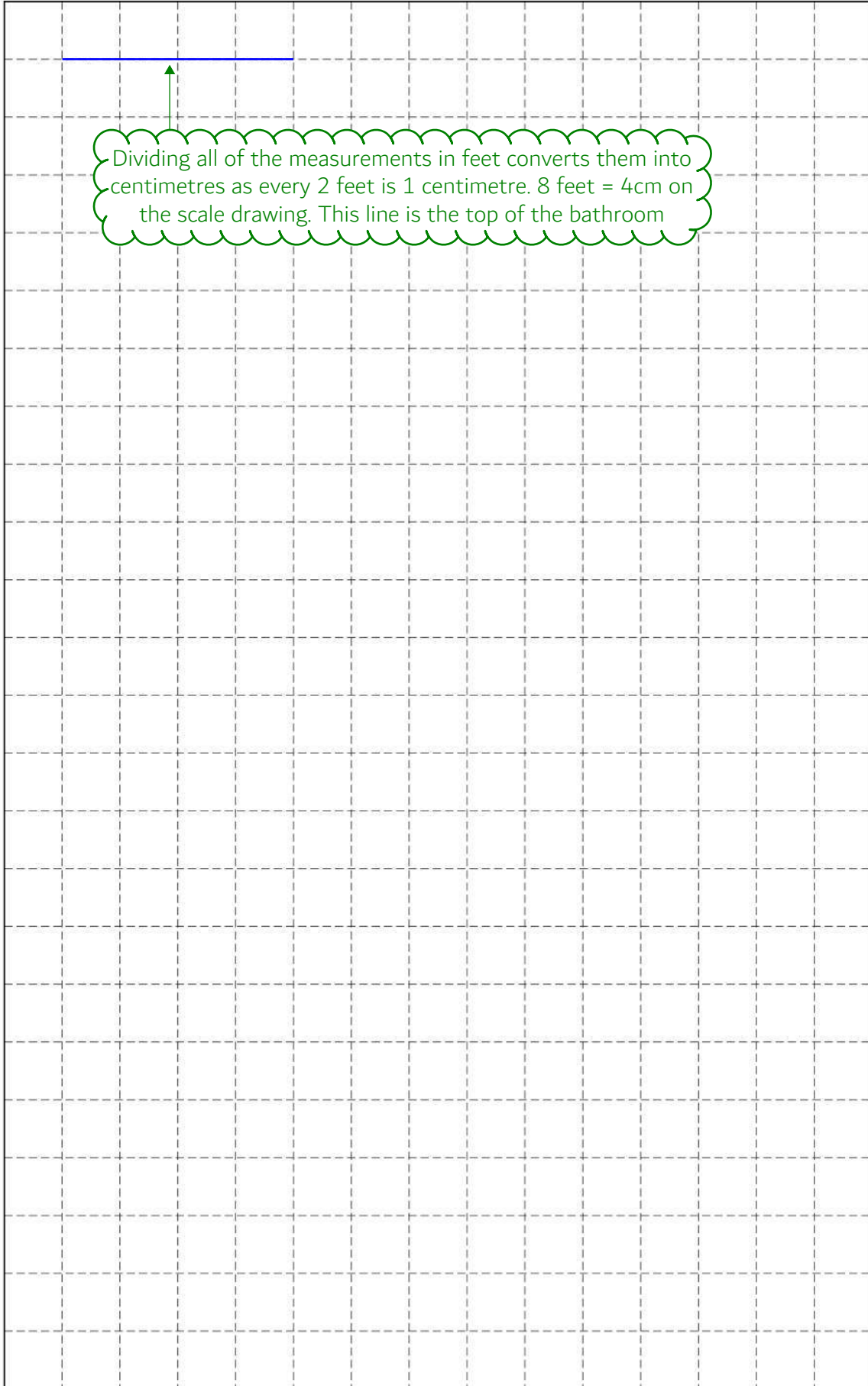


On the grid on the opposite page, make an accurate scale drawing of the plan.
Label each room.

Use a scale of 1 cm represents 2 feet

[3 marks]



Scale: 1 cm represents 2 feet*Do not write
outside the
box*

Turn over ►



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]

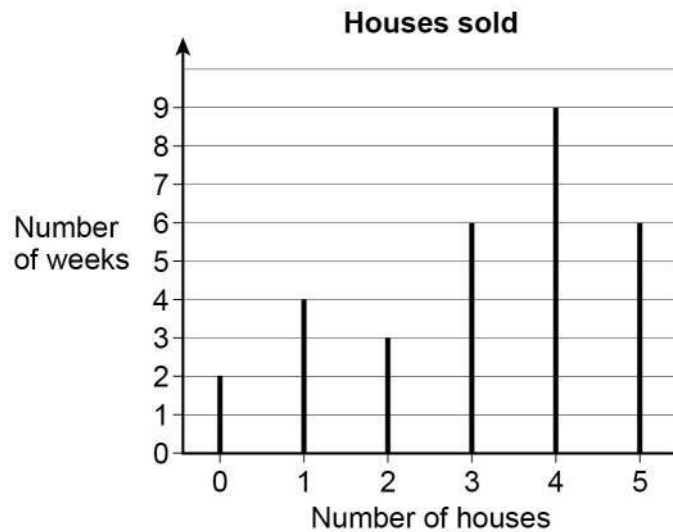
Let x be the number which is moved.
 Sum of Group A - x + 20 = sum of Group B + x
 Create the equation then rearrange to find x

If we want to avoid using algebra, we could add up all the numbers in Group A and add up all the numbers in Group B to get the current sums. Then try moving one number at a time using trial and error until it makes the new sum of B 20 more than the new sum of A

Answer _____



- 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]

Range = largest - smallest. The largest number sold in a week were 5

Answer _____

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

[2 marks]

Using $(n + 1)/2$, where n is the number of pieces of data, tells us which value is the median.
Do a cumulative frequency (add up the frequencies as they go) until we reach the values which are either side of the median. Work out what number is halfway between these two

Answer _____



- 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]

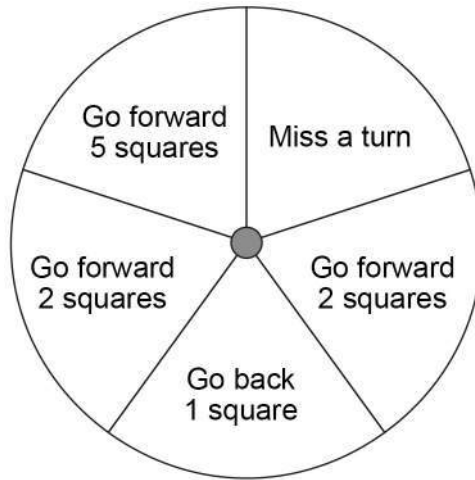
Express 2% as a fraction or decimal then
multiply this by the total of the house prices

Answer £ _____

Turn over for the next question



- 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 out of the 5 equal sections are 'Miss a turn'. The fraction of the sections which are 'miss a turn' is equal to the probability

- 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 _____

1 out of the 5 equal sections are 'Go back 1 square'. The probability is not effected by the fact it has landed on it three times in a row



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

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

[2 marks]

2 out of the 5 equal sections are 'Go forward 2 squares' so the probability of it being this is $\frac{2}{5}$.
We would expect $\frac{2}{5}$ of the 85 spins to be it

Answer _____

11 Circle the cube number.

[1 mark]

9

10 000

333

729

Cube numbers are the result of cubing a number so therefore they can be cube rooted to get a whole number

12 How many minutes is 225 seconds?

Circle your answer.

[1 mark]

$2\frac{5}{12}$

$2\frac{1}{4}$

$3\frac{1}{4}$

$3\frac{3}{4}$

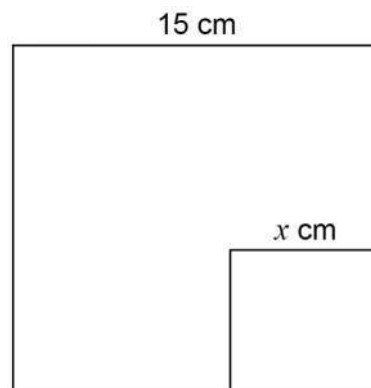
There are 60 seconds in a minute so dividing 225 by 60 converts it into minutes



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 square = length². Finding $\frac{1}{9}$ of the area of the large square gives the area of the small square. Square rooting this area gives the side length of the small square, x

Answer _____



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]

Press -24 then =
 $(\text{Ans} + 8)/2 = \dots$
 $(\text{Ans} + 8)/2 = \dots$

Answer _____ and _____

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

..... 120

Work out the first term.

[2 marks]

Do the exact opposite in the opposite order twice
to work out the second term then the first term

Answer _____

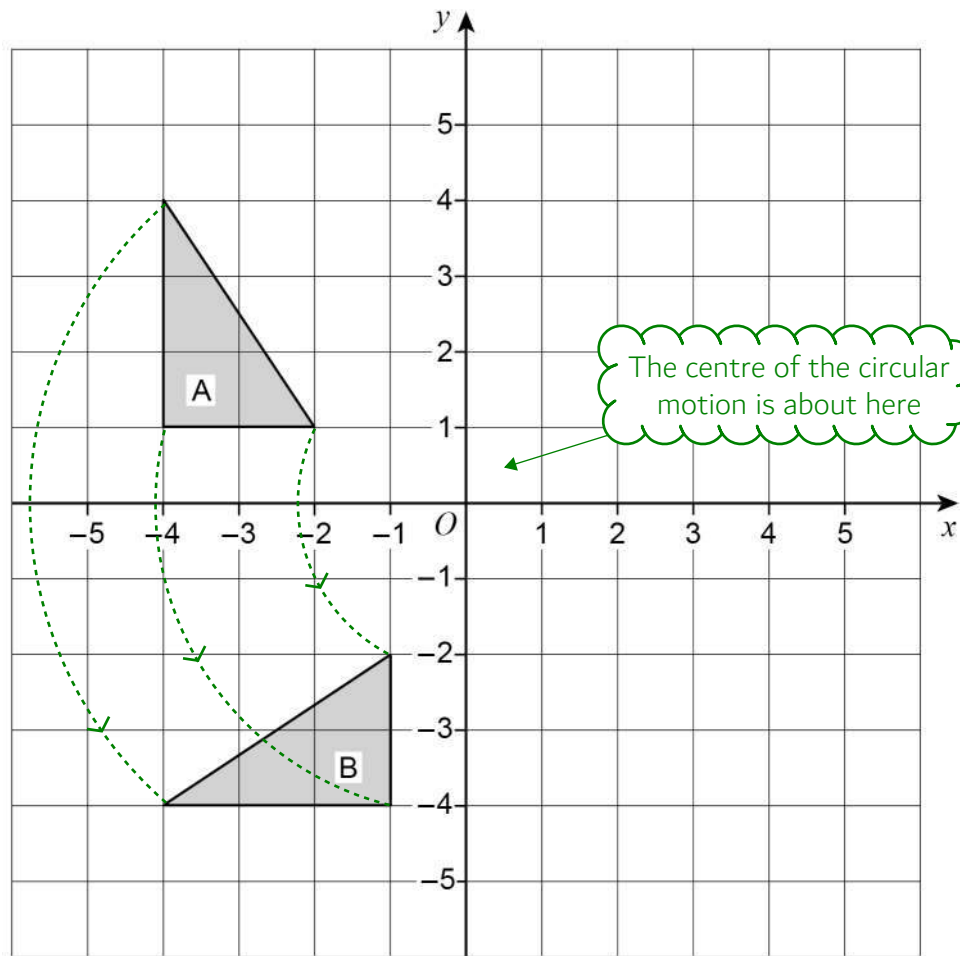
7

Turn over ►



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

[3 marks]



Rotation...

We need to state how much by, in which direction and around which point

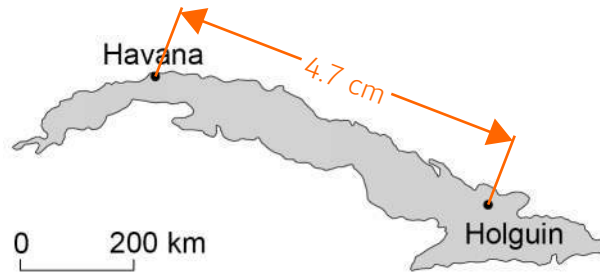
To work out which point it is rotating around, use tracing paper to sketch around triangle A. Put something sharp (maybe the needle of a compass) in at certain coordinates and try rotating the paper around that point. Keep trying until the sketch of A rotates onto B



17

Here is a map of Cuba.

1.5 cm represents 200 km



Work out the actual distance from Havana to Holguin.

[3 marks]

Working out how many lots of 1.5cm the measured distance of 4.7cm
is also works out how many lots of 200km the actual distance is

Answer _____ km



- 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]

Mean = total/number. The total is £83.40. To work out the number (which is the number of presents given), consider that 4 friends each give 3 presents

Answer £ _____

Turn over for the next question



- 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]

Express the number of parts for beech as a fraction of the total number of parts in the ratio

Answer _____

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

[1 mark]

Divide the left side of the ratio to get 1. Divide the right side by the same amount to keep it equivalent

Answer _____ : _____



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

The top number of the vector is the x direction.
The bottom number of the vector is the y direction

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

Complete the error interval.

[2 marks]

The resolution is 1cm. Half the resolution then add and subtract it from 110 to get the upper and lower bound

_____ cm \leq length < _____ cm

Turn over for the next question



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]

Use table mode by pressing menu then 3. Set $f(x) = x^2 + 9x + 1$. Ignore $g(x)$. Start: 1. End: 9. Step: 1. This lists out all of the values of k needed

Prime numbers only have two factors, themselves and 1

FACT B

0 9 "

To check if a number is prime by using your calculator, enter the number, press equals, press SHIFT then press FACT (the button on the left). This expresses the number as a product of prime factors. If it comes back as itself, it must be prime



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]

$$2t + c = 3.40$$

2 teas and 1 coffee cost £3.40.
This is expressed as an equation

1 tea and 4 coffees cost £7.30. Use this to make another equation then solve them simultaneously. This can be done by multiplying one or both of the equations to get the same number of t or c in both. Then subtracting the equations from each other will eliminate the t or c, leaving an equation which can be rearranged and solved to find t or c. Once either t or c is found, the other can be found by substituting in the value found into one of the original equations then rearranging it to solve for the other

Tea _____

Coffee _____

Turn over for the next question**Turn over ►**

24

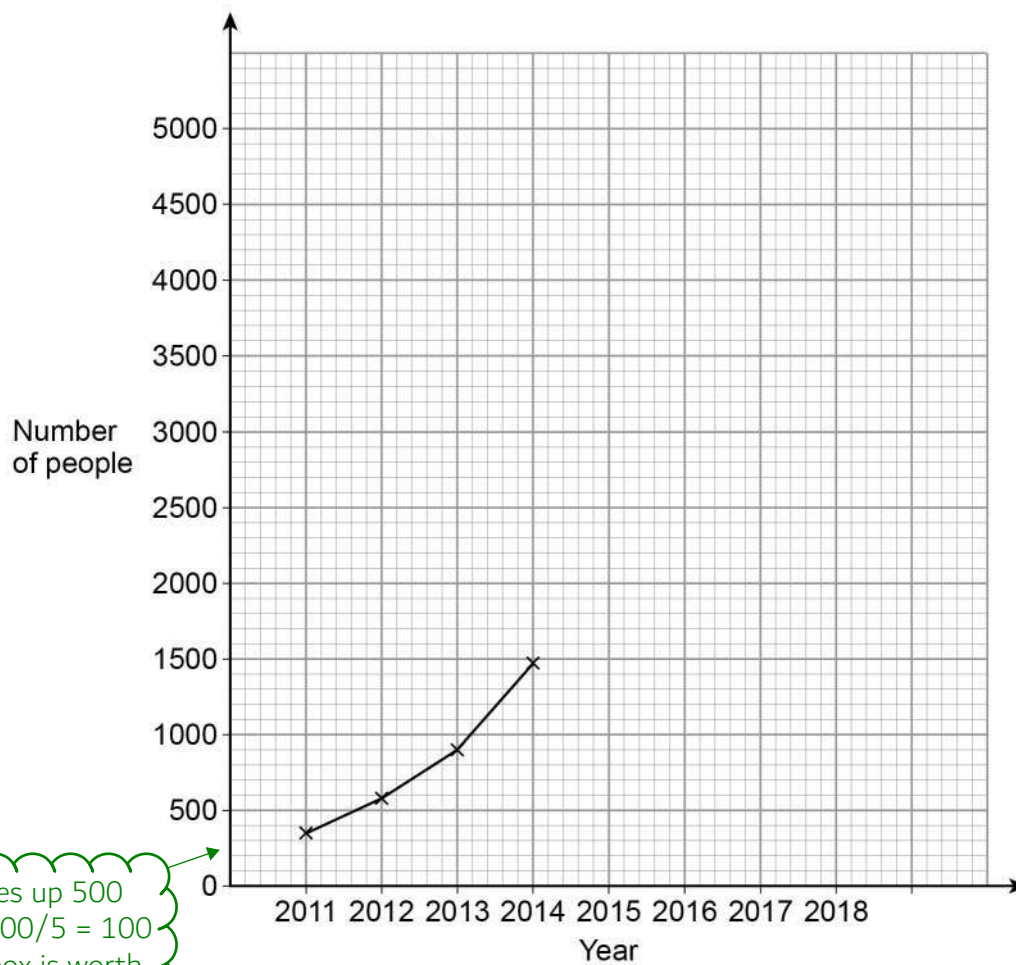
A music festival has taken place each year from 2011

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.



The scale goes up 500 over 5 boxes. $500/5 = 100$ so each little box is worth 100 in the y direction



24 (a) Complete the graph.

[2 marks]

Plot the values for 2015, 2016, 2017 and 2018
then join them up with a series of straight lines

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

[2 marks]

The trend could continue upward with a similar gradient for 2019

Answer _____

Turn over for the next question



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.

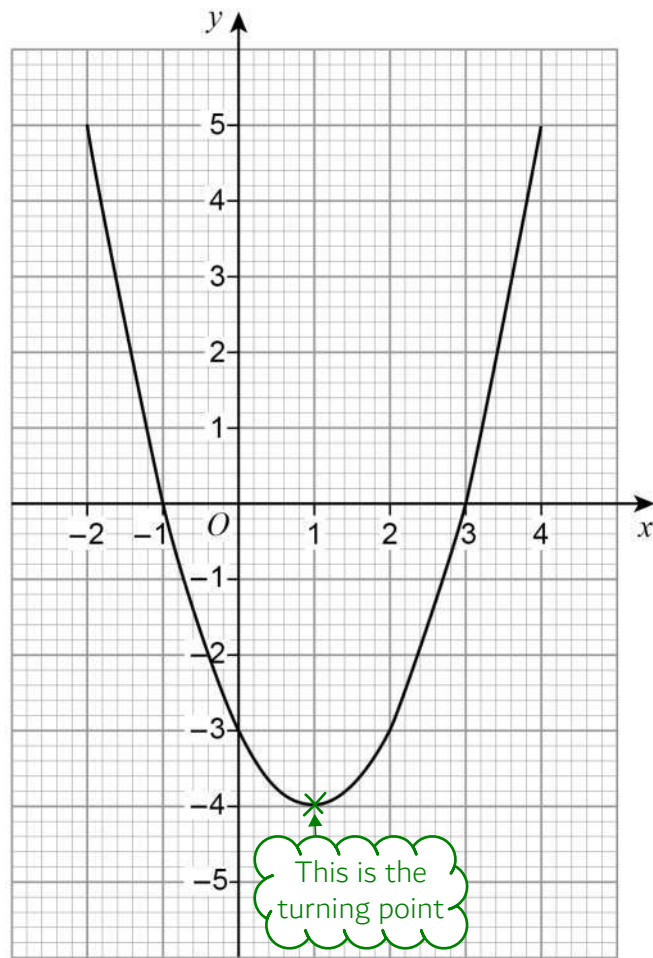
[3 marks]

100% - 20% = 80%, so paying back 20% leaves 80% of the amount he owes.
80% as a decimal is 0.8 so multiplying by this reduces the amount by 20%.
Reduce the amount by 20% 5 times to see if he his method is correct



26

Here is a quadratic graph.

Circle the x -coordinate of the turning point of the graph.

[1 mark]

-4

-1

1

3

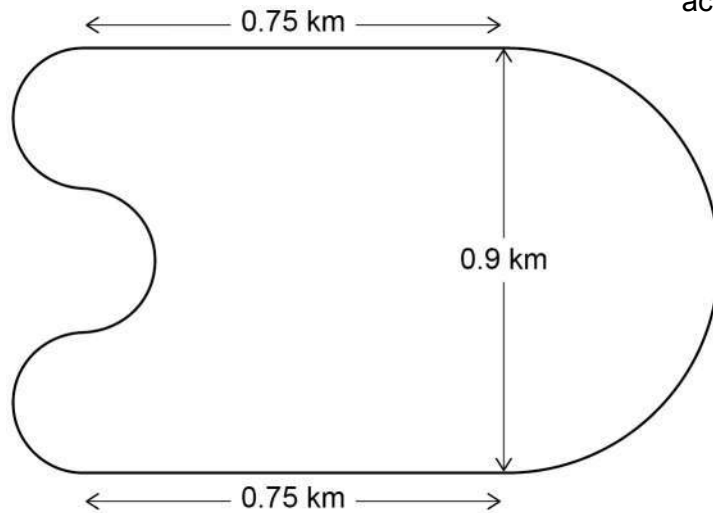
Turn over for the next question

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]

Dividing the 305km by the distance of one full lap gives the number of laps needed. The result will be a decimal so it needs to be rounded to a whole number.

$$\text{Circumference} = \pi \times \text{diameter}$$

Answer _____



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

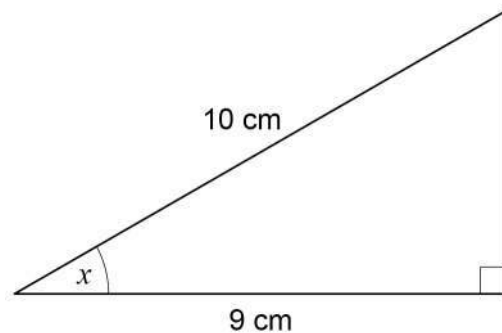
[2 marks]

Rearrange to make x the subject. The inequality behaves in a similar way to an equation but when dividing by a negative, the inequality symbol needs to flip

Answer _____

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

[2 marks]



Not drawn
accurately

SOHCAHTOA

Listing SOH CAH TOA as formula triangles then ticking what we have.
If there are two ticks on one of the formula triangles, it can be used

Answer _____ degrees

END OF QUESTIONS

