Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

# GCSE MATHEMATICS

**F**

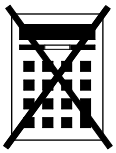
Foundation Tier Paper 1 Non-Calculator

Time allowed: 1 hour 30 minutes

## Materials

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator.



## 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 | |
| 26 | |
| **TOTAL** | |

**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

**.CG Maths.**

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

*Do not write outside the box*

**1** Circle the answer to $0.02 \times 100$

**[1 mark]**

0.2 | 2 | 20 | 200

Moving the decimal point twice to the right multiplies it by 100

**2** Circle the expression that is equal to $x + x + x - x + x$

**[1 mark]**

$x$ | $2x$ | $3x$ | $4x$

1 + 1 + 1 - 1 + 1 = 3 so there are 3x

**3** What is 260 millimetres in centimetres?

Circle your answer.

**[1 mark]**

0.26 cm | 2.6 cm | 26 cm | 2600 cm

There are 10 millimetres in 1 centimetre so dividing 260 by 10 converts it into centimetres

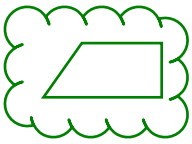
*Do not write outside the box*

**4** Which shape **can** have sides with lengths that are all different?

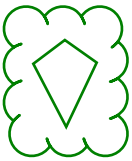
Circle your answer.

**[1 mark]**

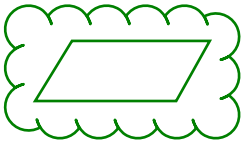
trapezium



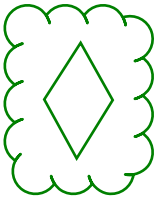
kite



parallelogram



rhombus



**5** Work out $(-8) \times 5$

**[1 mark]**

Answer -40

8 x 5 = 40 so this will be the same but negative

**Turn over for the next question**

5

*Do not write outside the box*

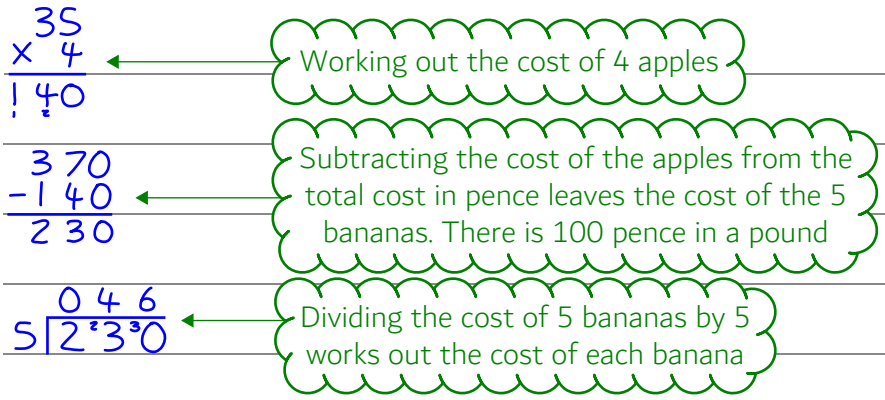
**6** Luke buys 4 apples and 5 bananas.

The total cost is £3.70

Each apple costs 35p

Work out the cost in pence of each banana.

**[4 marks]**




Answer 46 pence

*Do not write outside the box*

**7** Rashid counted the pieces of homework he had done in three subjects.

He draws a pictogram to show the results.

**Key:** ⊕ represents 4 pieces of homework

| | |
|---|---|
| **Maths** | ⊕ ⊕ ⊕ ⊕ ⊕ |
| **English** | ⊕ ⊕ ⊕ ◁ |
| **Geography** | ⊕ ◁ |

**7 (a)** Rashid had done 5 pieces of Geography homework.

Show this information on the pictogram.

**[1 mark]**

Each quarter of a symbol represents 1 piece of homework.
So 5 quarters represents 5 pieces of Geography homework

**7 (b)** Rashid spent 30 minutes on each piece of homework.

Work out the **total** time he spent on homework for these three subjects.

Give your answer in hours and minutes.

**[3 marks]**

20
+14
+ 5
39

Each quarter of a symbol represents 1 piece of homework. There are 20 quarters for Maths so these represent 20 pieces of homework. There are 14 quarters for English so these represent 14 pieces of homework. There are 5 pieces of homework for Geography. Adding these all together gives the total number of pieces of homework

19 r1
2 ) 39

30 minutes is half of an hour. 1/2 x 39 = 39/2.
The remainder of 1 can be left as 1/2

Answer 19 hours 30 minutes

$19^1/_2$ hours

8

**Turn over ►**

*Do not write outside the box*

**8** A travel company is taking some passengers on a trip.

They can use coaches or minibuses.

Each coach can carry 53 passengers.

Each minibus can carry 12 passengers.

The passengers going on the trip would exactly fill 3 coaches.

If the company uses only minibuses, how many will they need?

**[4 marks]**

$$\begin{array}{r} 53 \\ \times\ 3 \\ \hline 159 \end{array}$$

Working out the total number of passengers

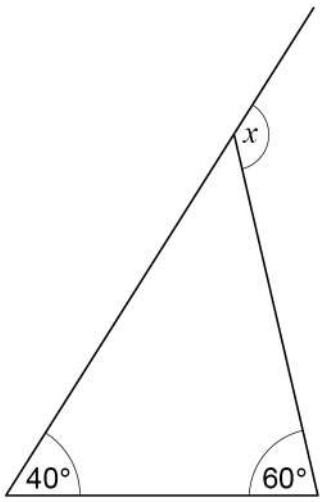
$$12\overline{)159} \quad 13$$

Working out how many lots of 12 go into the total number of passengers by dividing by 12. Each lot of 12 is 1 minibus needed. There is a remainder so an extra minibus will be needed

Answer 14

*Do not write outside the box*

**9** One side of a triangle is extended.




Not drawn accurately

Circle the size of angle $x$.

**[1 mark]**

100° 80° 60° 40°

40 + 60 = 100 so there are this many degrees used so far in the shape. There are 180° in a triangle so subtracting 100 leaves the missing angle in the triangle, which is 80°. There are 180° around a point on a straight line so 180 - 80 leaves angle x

**10** Pavel uses his calculator to work out $352 \times 7268$

Circle the **last** digit in the answer.

**[1 mark]**

0 2 6 8

8 x 2 = 16 so the last digit must be a 6 as 0s will be added on all of the other lines of working out and adding 0s to 6 will still be 6

**Turn over for the next question**

6

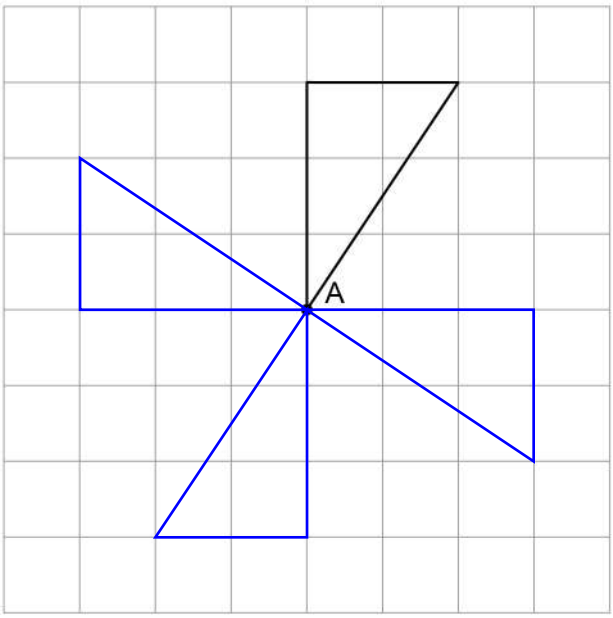
*Do not write outside the box*

**11** Complete the diagram so that it has

rotational symmetry of order 4

centre of rotation at point A.

**[2 marks]**



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**12** 10% of 2100 is 210

Work out 43% of 2100

**[3 marks]**

43
×21
43
860
903

1% of 2100 is found by dividing it by 100, which is 21. Multiplying this by 43 works out 43%

Answer 903

**Turn over for the next question**

5

Do not write outside the box

**13** Katy records the number of cars using a drive-through each hour for 24 hours.
Here are the results.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | 20 | 37 | 53 | 42 | 41 | 24 | 18 | 39 | 35 | 40 | 47 |
| 38 | 17 | 23 | 18 | 13 | 35 | 10 | 7 | 6 | 18 | 31 | 57 |

Katy makes this tally and frequency chart to put the data into groups.

| Number of cars | Tally | Frequency |
|---|---|---|
| 0 to 10 | | |
| 10 to 20 | | |
| 20 to 30 | | |
| 30 to 40 | | |
| 40 to 50 | | |

Make **two** criticisms of Katy's tally and frequency chart.
You do **not** need to complete the chart.

**[2 marks]**

Criticism 1 The categories overlap

For example, 10 could go in 0 to 10 or in 10 to 20

Criticism 2 No category for over 50

53 and 57 have nowhere to go

*Do not write outside the box*

**14** Counters in a bag are red, white or blue.

A counter is picked at random.

Complete the table.

**[2 marks]**

| | Red | White | Blue |
|---|---|---|---|
| **Probability** | 0.15 | 0.4 | 0.45 |

1.00
−0.15
−0.40
0.45

It is certain to get red, white or blue so therefore the probabilities have to add up to 1. Subtracting the probability for red and the probability for white from 1 leaves the probability for blue

**Turn over for the next question**

4

*Do not write outside the box*

**15** Here is a calculation.

$$31 \times 84 = 2604$$

You can use the calculation to help answer the following questions.

**15 (a)** Work out $2604 \div 84$

**[1 mark]**

Answer 31

Dividing both sides of the equation by 84 gives 31 = 2604/84

**15 (b)** Work out $3.1 \times 8.4$

**[1 mark]**

Answer 26.04

31 and 84 are both divided by 10 to give 3.1 and 8.4.
This has the effect of dividing the answer by 10 twice

**15 (c)** Work out $31 \times 85$

**[2 marks]**

2604
+ 31

There is one more lot of 31

Answer 2635

*Do not write outside the box*

**16** A password has 30 characters.

It is made up of 5 numbers, 15 letters and some symbols.

Work out the ratio numbers : letters : symbols

Give your answer in its simplest form.

**[2 marks]**

5 : 15 : 10

There are 10 symbols as subtracting the numbers and letters from the characters leaves the number of symbols. 30 - 5 - 15 = 10

Answer 1 : 3 : 2

The ratio is simplified by dividing everything by 5. They cannot be divided any further to get whole number parts

**17** Work out $\frac{5}{6} + \frac{7}{12}$

Give your answer as a mixed number.

**[3 marks]**

$\frac{10}{12} + \frac{7}{12}$ ← A common multiple of 6 and 12 is 12. Converting the first fraction so that the denominator is 12 by multiplying both the numerator and denominator by 2

$\frac{17}{12}$ ← Once the denominators are the same the numerators can be added

Answer $1\frac{5}{12}$

12 goes into 17 once with a remainder of 5.
Or the fraction can be split into 12/12 + 5/12

9

*Do not write outside the box*

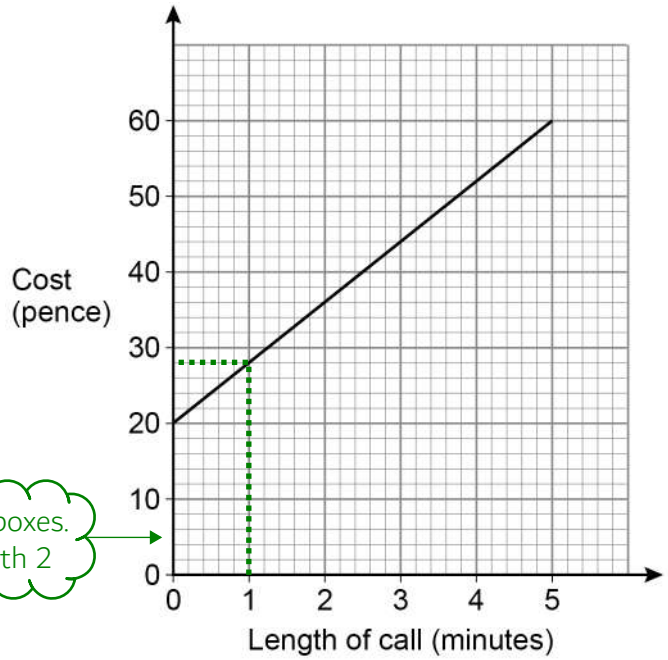
**18** The cost of making a phone call is

a fixed charge

and

a charge per minute.

The costs of phone calls up to 5 minutes are represented by the graph.




The scale goes up 10 over 5 boxes.
10/5 = 2 so each box is worth 2

**18 (a)** Write down the fixed charge.

**[1 mark]**

Answer 20 pence

There is no charge added for the minutes used when the length of call was 0 minutes. The cost is 20p when this is the case

*Do not write outside the box*

**18 (b)** Work out the charge per minute.

**[2 marks]**

28-20 ← The cost of a 1 minute call is 28p. 28 - 20 works out the difference between this and the fixed price to work out the charge per minute

Answer 8 pence

**18 (c)** Work out the cost of a phone call lasting 7 minutes.

**[2 marks]**

20+7X8 ← The fixed charge add 7 lots of the charge per minute

Answer 76 pence

**Turn over for the next question**

5

*Do not write outside the box*

**19** A company sells bags of toffees and bags of mints.

Here are the numbers of sweets in 11 bags of toffees.

55 ~~50~~ ~~49~~ (51) 55 ~~47~~ 54 ~~50~~ ~~49~~ 55 57

Here are the numbers of sweets in 10 bags of mints.

~~46~~ ~~47~~ ~~47~~ ~~48~~ (48) (50) 53 54 54 54

The company claims that the average number of sweets per bag is at least 50

Using medians, is the company's claim correct for each type of sweet?

You **must** work out the median for toffees and the median for mints.

**[4 marks]**

Toffees $\frac{11+1}{2} = 6$

51

Using the formula (n + 1)/2, where n is the number of pieces of data, tells us that the 6th value is the median. Crossing out the numbers starting with the smallest until the 6th is reached

Tick a box for toffees.

☑ Yes ☐ No

The median for the toffees is 51, which is at least 50

Mints $\frac{10+1}{2} = 5.5$

49

Using the formula (n + 1)/2, where n is the number of pieces of data, tells us that the 5.5th value is the median, so is halfway between the 5th and 6th. Crossing out the numbers starting with the smallest until the 5th and 6th are reached

Tick a box for mints.

☐ Yes ☑ No

The median for the mints is 49 as this is halfway between 48 and 50, which is not at least 50

Do not write outside the box

**20** Freddie tries to work out $\dfrac{29.15 + 83.47}{9.82}$

His answer is 37.65

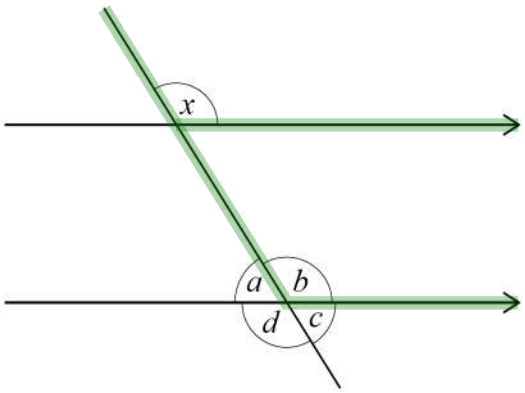
By rounding each number to the nearest 10, show that his answer is incorrect.

**[3 marks]**

$\frac{30+80}{10} = 11$

37.65 is not close to 11 so is most likely incorrect

**21** A straight line passes through two parallel lines.




Not drawn accurately

The insides of the F are corresponding

Circle the angle that is **corresponding** to angle $x$.

**[1 mark]**

$a$ $b$ $c$ $d$

8

*Do not write outside the box*

**22 (a)** Lucy wants to simplify $6a - (7b - 2a)$

She writes $4a - 7b$

Is she correct?

Tick a box.

☐ Yes ☑ No

Give a reason for your answer.

**[1 mark]**

4a is wrong

It should be 8a as 6a - -2a = 6a + 2a = 8a

**22 (b)** Lucy also wants to simplify $3p^2 \times 5p^7$

She says,

"Add 3 and 5, then add 2 and 7"

Her answer is $8p^9$

Tick a box for each part of her method.

**[1 mark]**

| | **Correct** | **Not correct** | |
|---|---|---|---|
| Add 3 and 5 | ☐ | ☑ | ← Should multiply 3 and 5 |
| Add 2 and 7 | ☑ | ☐ | ← $a^x \times a^y = a^{x+y}$ |

*Do not write outside the box*

**22 (c)** Lucy thinks of a number.

$10 \times$ the number $= 10 \div$ the number

Give a possible value of the number.

**[1 mark]**

Dividing and multiplying by 1 has no effect on the 10. 10 x 1 = 10 and 10/1 = 10

Answer 1

**23** Lily's age is 2 years and 4 months.

Hugo's age is 1 year and 8 months.

Write Lily's age in months as a fraction of Hugo's age in months.

Give your fraction in its simplest form.

**[2 marks]**

$\frac{2\times12+4}{12+8}$

Converting both Lily's and Hugo's age into months by multiplying the years by 12 and adding the months. There are 12 months in a year. Writing Lily's ages over Hugo's age

$\frac{28}{20}$

Answer $\frac{7}{5}$

28/20 is simplified by dividing both the numerator and denominator by 4

5

*Do not write outside the box*

**24** Working alone, it takes Kevin 4 hours to paint an area of 12 $m^2$

Kevin and Steve are going to paint an area of 24 $m^2$

Kevin says,

"Working together at the same rate it will take us 8 hours, because 24 is 2 × 12"

Is he correct?

Tick a box.

☐ Yes ☑ No

Give a reason for your answer.

**[1 mark]**

Will be 4 hours

The area is twice as much so it will take twice as long. But there are also twice as many people meaning it will take half the time. Overall there is no effect in the time

Do not write outside the box

**25 (a)** Solve $5x + 6 > 3x + 15$

**[3 marks]**

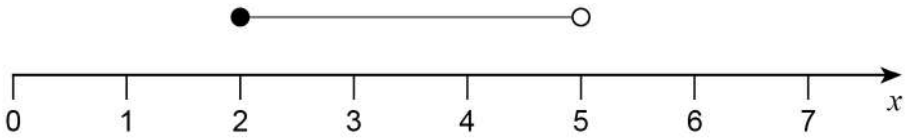
$2x+6>15$ ← Subtracting 3x from both sides to get all the x terms on the same side

$2x>9$ ← Subtracting 6 from both sides to get the x terms on their own

Dividing both sides by 2 to get x on its own

Answer $x > \frac{9}{2}$

**25 (b)** Write down the inequality represented by the number line.




**[2 marks]**

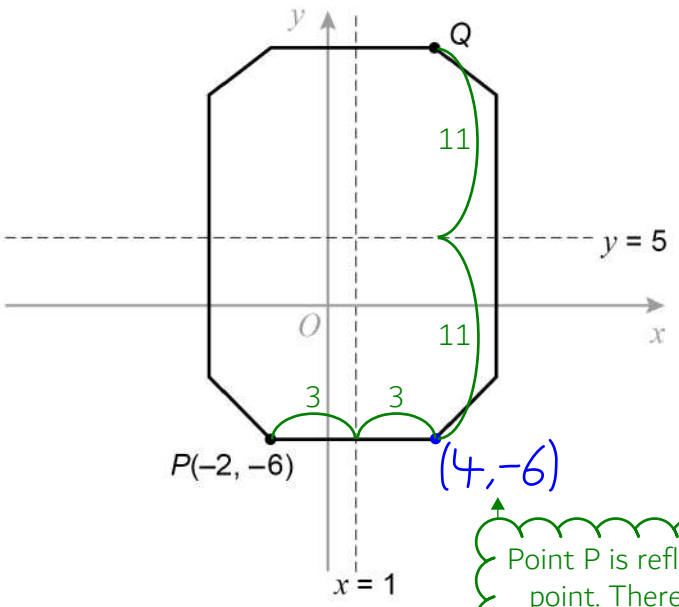
Answer $2 \leq x < 5$

The line runs between 2 and 5. As the dot is shaded above 2, x can also equal to 2

6

*Do not write outside the box*

**26** The diagram shows an octagon.




Not drawn accurately

Point P is reflected on the line x = 1 to get this point. There are 3 jumps to the line in the x direction, as the difference between 1 and -2 is 3, so another 3 jumps are done on the other side. 1 + 3 = 4. The y coordinate stays the same

$x = 1$ and $y = 5$ are lines of symmetry.

Work out the coordinates of point $Q$.

**[2 marks]**

(4 , -6) is reflected on the line y = 5 to get point Q. There are 11 jumps to the line in the y direction, as the difference between 5 and -6 is 11, so another 11 jumps are done on the other side. 5 + 11 = 16. The x coordinate stays the same

Answer ( 4 , 16 )

*Do not write outside the box*

**27 (a)** Work out $2000 \times 70\,000$

Give your answer in standard form.

**[2 marks]**

140000000

2 x 7 = 14. Multiply by 10 7 times, so add 7 0s, as 2000 is 2 multiplied by 10 3 times and 70000 is 7 multiplied by 10 4 times

140000000 is divided by 10 8 times to get 1.4 so therefore multiplying by $10^8$ to keep it equal

Answer $1.4 \times 10^8$

**27 (b)** Work out $\dfrac{1.8 \times 10^2}{3 \times 10^{-1}}$

Give your answer as an ordinary number.

**[2 marks]**

$0.6 \times 10^3$

18/3 = 6 so 1.8/3 = 0.6. $10^2/10^{-1} = 10^3$ as $a^x/a^y = a^{x-y}$

0.6 multiplied by 10 3 times

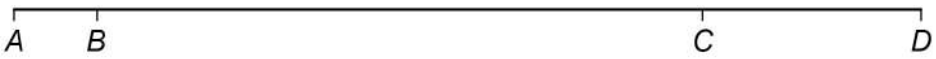
Answer 600

6

Do not write outside the box

**28** *A*, *B*, *C* and *D* are junctions on a motorway.

Not drawn accurately




distance *CD* = 3 × distance *AB*

distance *BC* = 25 miles

Salma drives from *A* to *C*.

She drives for 30 minutes at an average speed of 62 miles per hour.

Work out the distance *AD*.

**[4 marks]**

$s^d_t$ ← This is a speed, distance, time problem so writing out the formula triangle

$62 \times \frac{1}{2}$ ← Distance = speed x time so this works out the distance from A to C. 30 minutes is half an hour

$31 - 25$ ← AC - BC = AB

$6 \times 3$ ← AB x 3 = CD

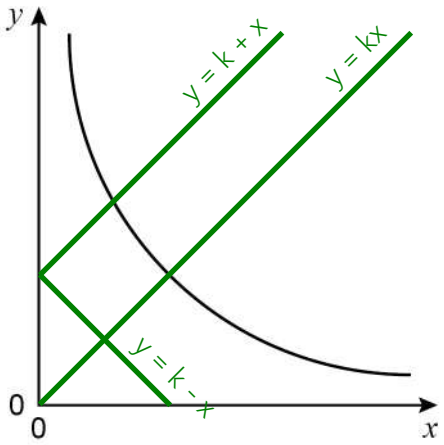
$31 + 18$ ← AC + CD = AD

Answer 49 miles

Do not write outside the box

**29** Here is a sketch of a graph.

All of the graphs are plotted assuming that k is 1




Circle the equation of the graph.

$k$ is a constant.

**[1 mark]**

$y = kx$ $\quad$ $y = k + x$ $\quad$ $y = k - x$ $\quad$ $y = \frac{k}{x}$

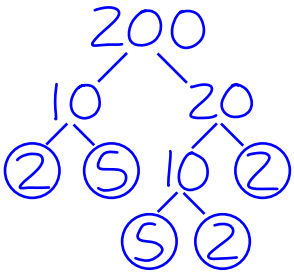
y increases as x increases for both of these so it can't be these two

y decreases as x increases for this one but it would be a straight line so it can't be this one

**30** Write 200 as a product of prime factors.

Give your answer in index form.

**[3 marks]**




Doing a factor tree for 200 and circling the primes

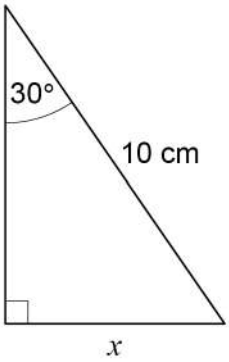
Multiplying all the circled primes gives this

Answer $2^3 \times 5^2$

8

*Do not write outside the box*

**31** Here is a right-angled triangle.




Not drawn accurately

Use trigonometry to work out the value of $x$.

**[3 marks]**

SOHCAHTOA

Right angled trigonometry can be used so writing SOH CAH TOA as formula triangles. Ticking H as we have the hypotenuse and O as we are finding the opposite

Sin30×10

There are two ticks on the SOH formula triangle so this one can be used. Opposite = (sin of the angle) x hypotenuse

$\frac{1}{2} \times 10$

Sin30 = 1/2. Working it out by listing the angles we need to remember which are 0, 30, 45, 60, 90. Listing 0, 1, 2, 3, 4 under these, square rooting them then putting them over 2. $\sqrt{1}/2 = 1/2$

Answer 5 cm

**32** Factorise $x^2 + 7x + 10$

**[2 marks]**

1, 10

2, 5

Listing out the factor pairs of 10 until a pair add to 7. Both of the pair must be positive as they are multiplying and adding to a positive. 2 and 5 work so putting these in brackets with x

Answer $(x+2)(x+5)$

**END OF QUESTIONS**

5