

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

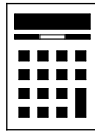
Foundation Tier Paper 2 Calculator

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a calculator
- mathematical instruments
- the Formulae Sheet (enclosed).



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.

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.

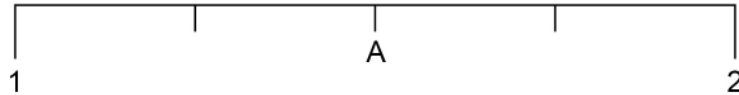
Anything written in green in a cloud doesn't have to be written in the exam.

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 Here is a number line.



Which number is at A?

Circle your answer.

[1 mark]

1.2 1.4 1.5 1.8

A is halfway between 1 and 2. $1/2 = 0.5$. $1 + 0.5 = 1.5$

- 2 Here is an expression $5a + 7b + 9c$

Which is the second term?

Circle your answer.

[1 mark]

a 7 $7b$ 9

Terms are separated by + or -. $5a$ is the first term. $7b$ is the second term. $9c$ is the third term

- 3 How many hours are there in 5 days?

Circle your answer.

[1 mark]

35 120 150 300

$5 \times 24 = 120$

There are 24 hours in a day. Multiplying this by 5 as there are 5 days



4 Which of these parts of a circle is a curve?

Circle your answer.

[1 mark]

circumference

diameter

centre

radius

Circumference is the curve around the outside of the circle. Diameter is a straight line going from one side of the circle to the other through the centre. The centre is the point in the middle of the circle. Radius is a straight line going from the centre of the circle to the outside

5 (a) Write $1\frac{4}{9}$ as an improper fraction.

[1 mark]

Mixed numbers can be put into the calculator by pressing SHIFT then the fraction button. It then converts it into an improper fraction

Answer $\frac{13}{9}$

5 (b) Convert $\frac{7}{16}$ to a decimal.

[1 mark]

The fraction can be put into the calculator then converted into a decimal

Answer 0.4375

5 (c) Round 2.84 to 1 decimal place.

[1 mark]

Answer 2.8

The 4 in the second decimal place causes it to round down to 2.8. Everything after the first decimal place is set to zero and ignored



6 A machine to clean carpets can be hired.

Machine hire

£25 per day

Cleaning fluid

1-litre bottle £10

2-litre bottle £18

Rana wants to
hire the machine for 1 day
and
buy 5 litres of cleaning fluid.

Work out the **smallest** total amount she could pay.

[3 marks]

$$25 + 18 \times 2 + 10$$

The £25 is for the machine hire for 1 day. $18 \div 2 = 9$ so 2-litre bottles are £9 per litre and are cheaper per litre than the 1-litre bottles. Therefore it is cheaper to buy as many 2-litre bottles as possible. The $£18 \times 2$ is for 2 of the 2-litre bottles and the £10 is for a 1-litre bottle. Adding together all of these costs works out the smallest total amount she could pay

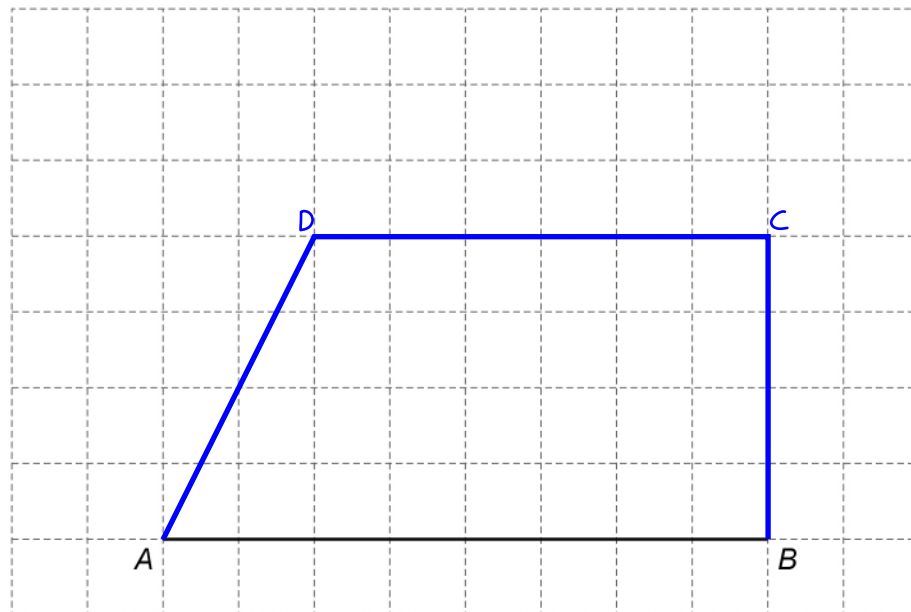
Answer £ 71



7

Quadrilateral $ABCD$ has

- angle $ABC = 90^\circ$
- $BC = 4\text{ cm}$
- CD is parallel to BA
- $CD = 6\text{ cm}$

Draw $ABCD$ on the centimetre grid. AB has been drawn for you.**[3 marks]**

First drawing a vertical line which is 4cm long to point C. This ensures that angle $ABC = 90^\circ$ and that $BC = 4\text{ cm}$. Then drawing a line to the left from point C which is 6cm long to point D. This ensures that CD is parallel to BA as it goes in the same direction and that $CD = 6\text{ cm}$. Drawing a line from D to A completes the quadrilateral

Turn over for the next question

Turn over ►



8 The masses of some puppies were recorded.

The smallest mass was 7 kilograms 200 grams.

The range of the masses was 650 grams.

What was the **largest** mass?

Give your answer in kilograms and grams.

[2 marks]

$$200 + 650 = 850$$

Range is the difference between the largest and smallest values. So adding the range onto the smallest mass works out the largest mass. 850g is less than 1kg so the number of kilograms is not effected

Answer 7 kilograms 850 grams

9 (a) Ali revises each day for five days.

On each of the first **four** days he revises from 5 pm to 8 pm

On the fifth day he starts revising at 1 pm

He finishes when he has revised for a **total** of 18 hours for the five days.

What time does he finish on the fifth day?

[3 marks]

$$8-5$$

Working out the difference between 5pm and 8pm works out that it is 3 hours

$$3 \times 4$$

Ali revises for 3 hours on each of the first four days. This works out that he revised for a total of 12 hours in the first four days

$$18-12$$

Subtracting the 12 hours Ali revises for in the first four days from the total of 18 hours works out that he needs to do another 6 hours

$$1+6$$

Adding the 6 hours onto the 1pm starting time on the fifth day

Answer 7pm



9 (b) Sofia is revising for Maths.

She tries to work out $3 \times (4 + 2)$

Here is her working.

$$\begin{aligned} 3 \times (4 + 2) &= 12 + 3 \\ &= 15 \end{aligned}$$

What mistake has she made?

[1 mark]

Did not multiply the 3 by 2

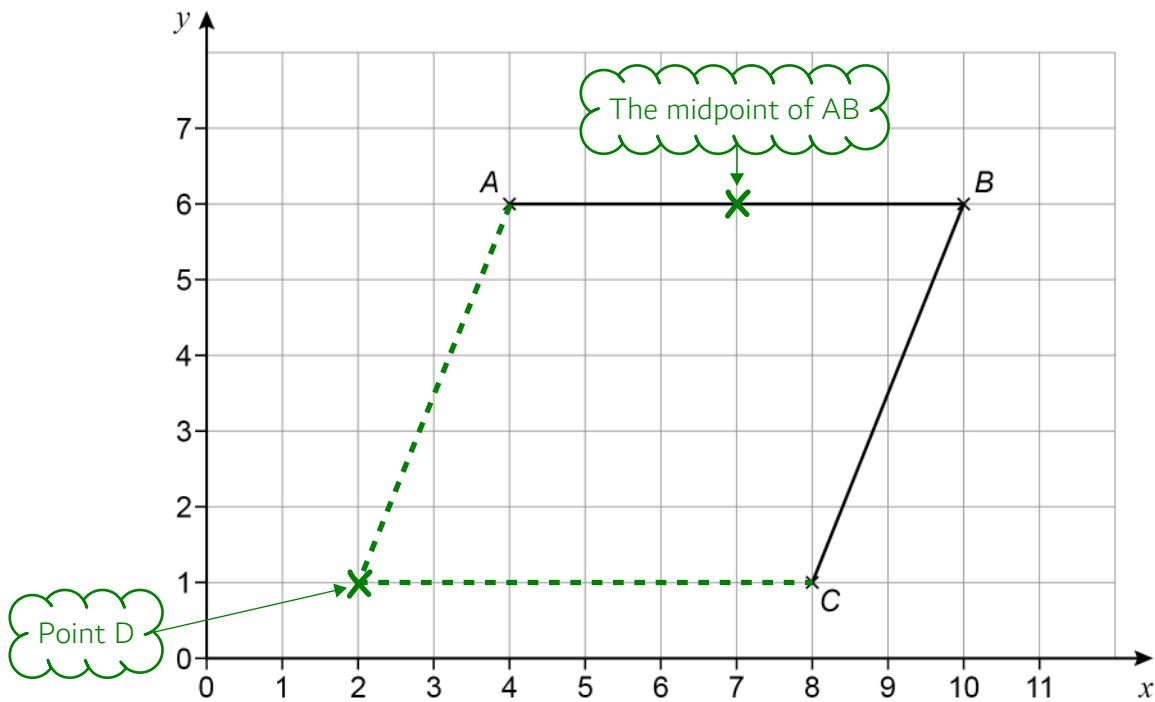
$$\begin{aligned} 3 \times (4 + 2) &= 3 \times 4 + 3 \times 2 = 12 + 6 = 18. \\ \text{Or } 3 \times (4 + 2) &= 3 \times 6 = 18 \end{aligned}$$

Turn over for the next question

Turn over ►



- 10 Lines AB and BC are shown.



- 10 (a) Write down the coordinates of C .

[1 mark]

Answer (8 , 1)

x-coordinate y-coordinate

- 10 (b) Write down the coordinates of the midpoint of AB .

[1 mark]

Answer (7 , 6)

x-coordinate y-coordinate



10 (c) D is the point on the grid that makes $ABCD$ a parallelogram.

Work out the coordinates of D .

[1 mark]

Answer (2 , 1)

The opposite sides of a parallelogram are equal in length and parallel

10 (d) Write down the equation of the line passing through A and B .

[1 mark]

Answer $y=6$

The y-coordinate of every point on the line passing through A and B is 6. The x-coordinate does not make any difference

Turn over for the next question

Turn over ►



11 Nihal has savings of £168

He uses $\frac{5}{7}$ of his savings to buy sports equipment.

11 (a) Assume that he will use $\frac{1}{3}$ of the **rest** of the money to buy a shirt.

How much of his savings, in £, will he have left?

[3 marks]

$$\frac{2}{7} \times 168$$

1 - $\frac{5}{7}$ = $\frac{2}{7}$ so after using $\frac{5}{7}$ of his savings to buy sports equipment he is left with $\frac{2}{7}$ of the £168. 'Of' means to multiply. This works out that the rest of the money is £48

$$\frac{2}{3} \times 48$$

1 - $\frac{1}{3}$ = $\frac{2}{3}$ so after using $\frac{1}{3}$ of the rest to buy a shirt he is left with $\frac{2}{3}$ of the £48. 'Of' means to multiply. This works out that he will have £32 left

Answer £ _____ 32 _____



11 (b) In fact, he uses **more** than $\frac{1}{3}$ of the rest of the money to buy a shirt.

What does this tell you about how much of his savings he has left?

Tick **one** box.

[1 mark]

It is more than the answer to part (a)

It is the same as the answer to part (a)

It is less than the answer to part (a)

It is not possible to tell

If he uses more than $\frac{1}{3}$ there will be less left as there will be less than $\frac{2}{3}$ left

Turn over for the next question

Turn over ►



- 12** Sue is working with 2-digit numbers.
She multiplies the digits together to get an answer.

For 63, she multiplies 6 by 3
so 63 gives an answer of 18

- 12 (a)** Write down a different 2-digit number that gives an answer of 18

[1 mark]

Answer _____ 36

$3 \times 6 = 18$

- 12 (b)** Write down a 2-digit number that gives an answer of 0

[1 mark]

Answer _____ 10

$1 \times 0 = 0$

- 12 (c)** Write down a 2-digit number that gives an answer **greater** than 70

[1 mark]

Answer _____ 99

$9 \times 9 = 81$



13

Steve and Molly each buy 480 tea bags.

Small packs
80 tea bags for £1.90

Large packs
160 tea bags for £3.25

Steve buys only small packs.

Molly buys only large packs.

In total, how much **more** than Molly does Steve pay?**[4 marks]**

$480 \div 80$

This works out how many lots of 80 the 480 is and therefore works out that Steve buys 6 small packs

$6 \times 1.90 = 11.40$

This works out the cost of 6 small packs and therefore finds that Steve pays £11.40

$480 \div 160$

This works out how many lots of 160 the 480 is and therefore works out that Molly buys 3 large packs

$3 \times 3.25 = 9.75$

This works out the cost of 3 large packs and therefore finds that Molly pays £9.75

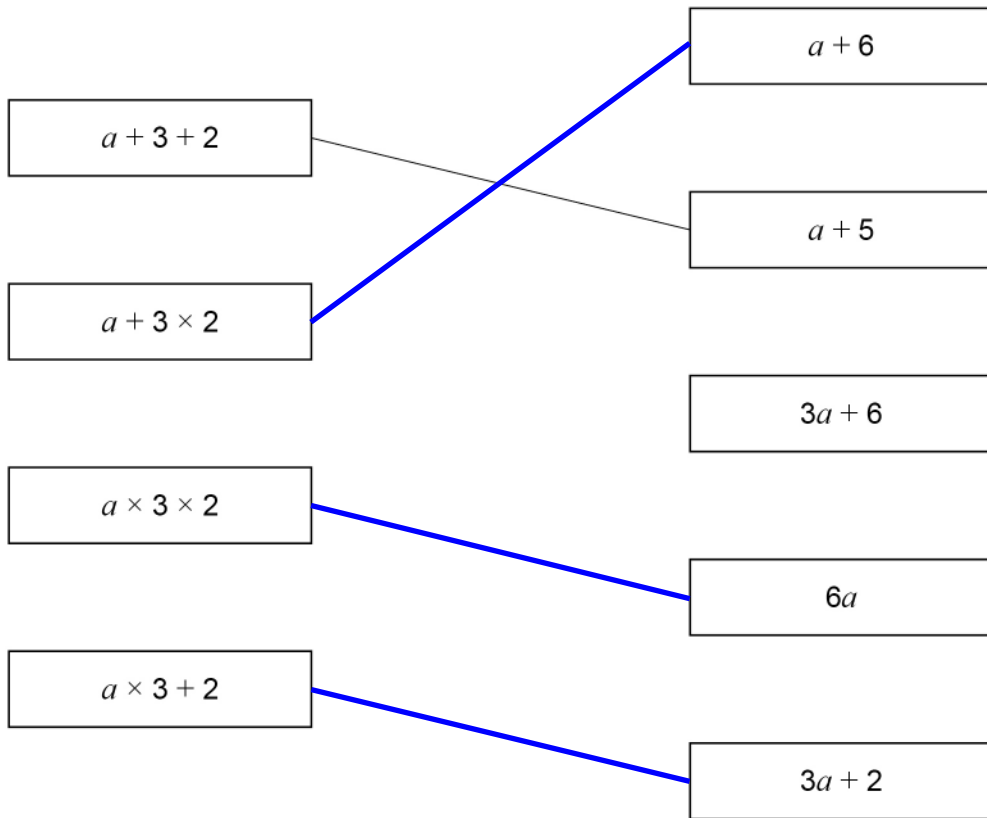
$11.40 - 9.75$

Subtracting the amount Molly pays from what Steve pays works out how much more Steve pays

Answer £ 1.65

- 14 Match each expression on the left with one on the right.
One has been done for you.

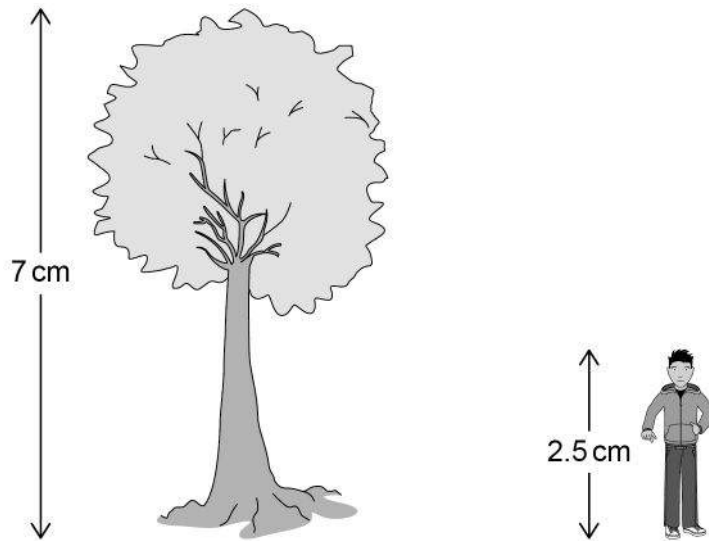
[3 marks]



Make sure to follow the order of operations, BIDMAS



- 15 The scale drawing shows a tree and a student.



The actual height of the tree is 4.2 metres.

Work out the actual height of the student.

[3 marks]

$$\frac{2.5}{7} \times 4.2$$

2.5/7 expresses the height of the student as a fraction of the height of the tree. Doing this fraction of the actual height of the tree works out the height of the student

Answer 1.5 m



16

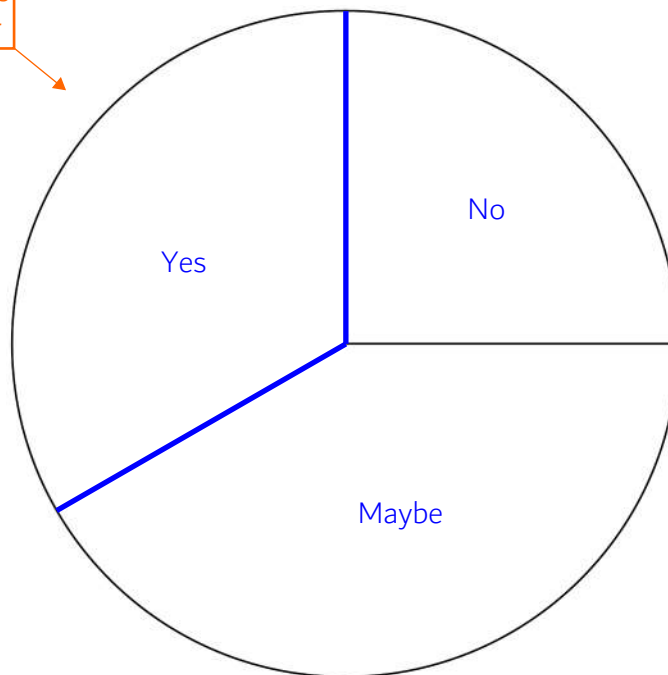
60 people were asked if they would vote in an election.

- $\frac{1}{4}$ of the people said No
- 20 people said Yes
- The rest said Maybe

Draw and label a pie chart to show this information.

[3 marks]

Drawing the angles
using a protractor



$$\frac{1}{4} \times 360 = 90$$

There are 360° in total in a pie chart. Doing the fraction which said no of the 360 works out that 90° represent no

$$\frac{20}{60} \times 360 = 120$$

There are 360° in total in a pie chart. Expressing the fraction of the people who said yes and doing the fraction of the 360 works out that 120° represent yes

The remainder of the pie chart must be for maybe



- 17 (a) x is at least 7
Circle the correct inequality.

[1 mark]

$x < 7$

$x \leq 7$

$x > 7$

$x \geq 7$

x needs to be greater than or equal to 7

- 17 (b) Multiply out $5c(2d + 1)$

[2 marks]

Answer $10cd + 5c$

$5c \times 2d = 5 \times 2 \times c \times d = 10cd.$
 $5c \times 1 = 5c$

- 17 (c) Factorise $21x + 28$

[1 mark]

Answer $7(3x + 4)$

7 is the highest common factor of $21x$ and 28. Bringing this out as a factor and leaving the rest in a bracket. $21x \div 7 = 3x$. $28 \div 7 = 4$



- 18 (a) The people at a party are either adults or children.

$$\text{adults : children} = 9 : 11$$

What percentage are adults?

[2 marks]

$$9 + 11$$

This works out that there are 20 parts in total in the ratio

$$\frac{9}{20} \times 100$$

9 out of the 20 parts are adults. Expressing this as a fraction. To convert any fraction to a percentage it can be multiplied by 100

Answer 45 %

- 18 (b) The people at a different party are from Spain, France or Germany.

68% are from Spain

number from France = number from Germany

Work out number from Spain : number from France

Give your answer in the form $n : 1$

[3 marks]

$$100 - 68$$

There is 100% in total. Subtracting the 68% from Spain leaves the percentage from France and Germany

$$32 \div 2$$

Dividing the percentage from France and Germany by 2 works out the percentage from France

$$68 : 16$$

Expressing the ratio of the number from Spain : number from France

$$68 \div 16$$

Simplifying the ratio to get 1 part on the right by dividing both sides by 16

Answer 4.25 : 1



19 (a) Circle the point that is on the line $4x + y = 7$

[1 mark]

(2, 1)

(2, -1)

(1, 2)

(-1, 2)

$$\begin{aligned} 4 \times 2 + 1 &= 9 \\ 4 \times 2 + -1 &= 7 \\ 4 \times 1 + 2 &= 6 \\ 4 \times -1 + 2 &= -2 \end{aligned}$$

Substituting in the x and y-coordinate into the left side of the equation. Only the second option satisfies the equation

19 (b) Write down the coordinates of the y-intercept of the line $y = 3x + 8$

[1 mark]

Answer (0 , 8)

The y-intercept must have an x-coordinate of 0 as the point is on the y-axis. When $x = 0$, $y = 3 \times 0 + 8 = 8$

19 (c) Work out the gradient of the line $2y = 10x$

[1 mark]

Answer 5

The general equation of a straight line is $y = mx + c$, where m is the gradient. Dividing both sides by 2 gives $y = 5x$, so the gradient is 5

Turn over for the next question

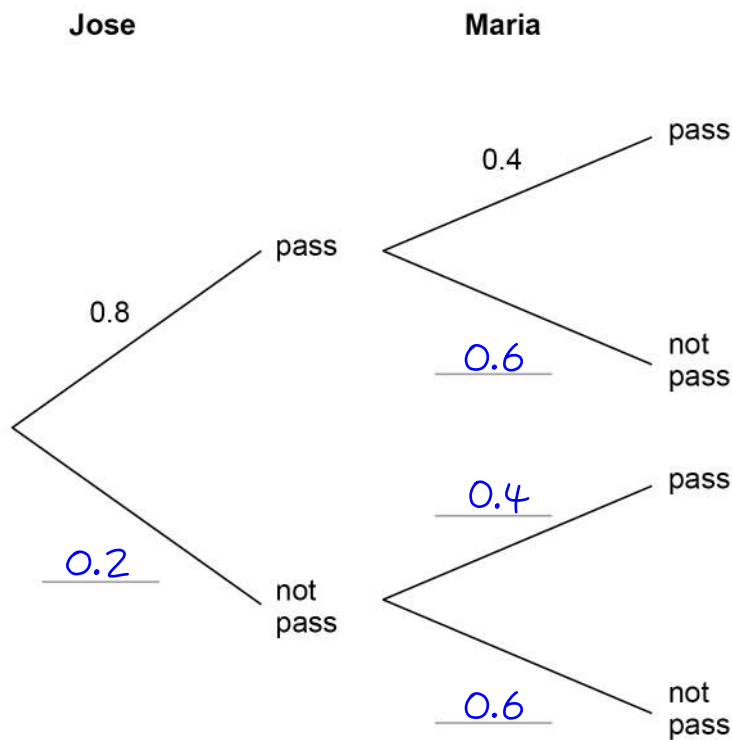
Turn over ►



- 20 Jose and Maria each take a test.
The probability that Jose passes is 0.8
The probability that Maria passes is 0.4

20 (a) Complete the tree diagram.

[2 marks]



It is certain to either pass or not pass so the probabilities need to add to 1 for each set of branches.
Maria is not effected by Jose so the probability is the same for the top and bottom branches

20 (b) Work out the probability that they **both** pass.

[1 mark]

$$0.8 \times 0.4$$

Pass AND pass. AND means to multiply the probabilities

Answer _____ 0.32 _____



21

Show that 2125 can be written as
a cube number **multiplied** by a prime number between 10 and 20

[2 marks]

Using table mode, enter $f(x) = 2125/x^3$. Start at 1 and end at 30 with a step of 1

This divides 2125 by the first 30 cube numbers. From the table of values, $2125/5^3 = 17$, which is a prime number between 10 and 20

$$5^3 \times 17 = 2125$$

Turn over for the next question

5

Turn over ►



22

A school play takes place each day from Monday to Friday.

Here are the attendances on four of the days.

Monday	Tuesday	Wednesday	Thursday
72	83	88	97

For all **five** days, the mean attendance is 90

Work out the attendance on Friday.

[3 marks]

 $m^t n$

Writing the formula triangle for mean, where m is the mean, t is the total (which is all of the values added together), and n is the number (the number of values)

 90×5

From the formula triangle, covering t finds that the total = mean x number. Multiplying the mean of 90 by the 5 days finds that the total attendance of all five days is 450

 $450 - 72 - 83 - 88 - 97$

Subtracting the attendance for the other four days from the total attendance of all five days leaves the attendance of Friday

Answer _____ 110 _____



- 23 Sam types a constant number of words per minute.
He takes 8 minutes to type a report of 416 words.
How long does it take him to type an essay of 1534 words?
Give your answer in minutes and seconds.

[3 marks]

$$\frac{1534}{416} \times 8$$

Expressing the 1534 words as a fraction of the 416 words then doing that fraction of the 8 minutes

29.5

Answer 29 minutes 30 seconds

29.5 minutes is $29\frac{1}{2}$ minutes. Half a minute is 30 seconds as there are 60 seconds in a minute and half of 60 is 30

24 $4y = 5x$

Which statement is correct?

$$4 \times 5 = 5 \times 4 \text{ so } y \text{ could be } 5 \text{ and } x \text{ could be } 4$$

Tick **one** box.

[1 mark]

y is 80% of x

y is bigger than x so it cannot be this option

y is 125% of x

5 is 25% more than 4 so it must be this option

x is 20% of y

4 is not 20% of 5 so it cannot be this option

x is 400% of y

y is bigger than x so it cannot be this option

Turn over ►



- 25 Rosie makes phone calls to try to sell broadband.
Today, she made 120 calls.
The table shows the results.

Result of call	Frequency
Not answered	33
Answered but sale not made	81
Answered and sale made	6

- 25 (a) Write down the relative frequency that a call was **not answered**.

[1 mark]

Answer $\frac{33}{120}$

33 out of the 120 calls were not answered

- 25 (b) During the **rest of the week**, Rosie will make 500 calls.

Using the results in the table, how many sales does she expect to make during the **rest of the week**?

[2 marks]

$$\frac{6}{120} \times 500$$

6 out of the 120 calls resulted in a sale made. Expressing this fraction then doing that fraction of the 500 calls as it can be expected that the fraction which resulted in a sale will be the same for all 500

Answer 25



26

Harry and Ellie each bought a printer and a hard drive.
Here is some information about how much they paid.

	Printer	Hard drive
Harry	£80	£25
Ellie	10% less than Harry	20% more than Harry

Ellie says,

“In total, I paid more than Harry because 20% is greater than 10%”

Is she correct?

Tick a box.

Yes

No

Show calculations to support your answer.

[2 marks]

$$\frac{10}{100} \times 80 = 8$$

Converting 10% into a fraction by putting it over 100 then multiplying it by the £80 finds that 10% of £80 is £8

$$\frac{20}{100} \times 25 = 5$$

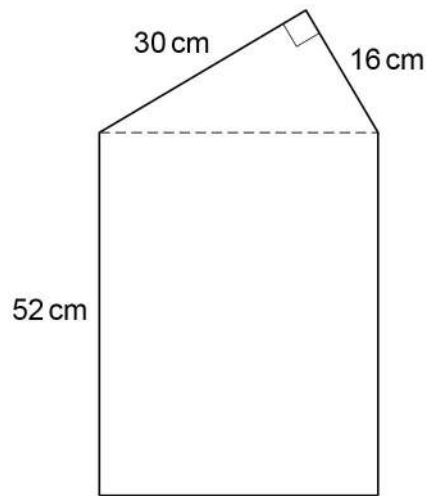
Converting 20% into a fraction by putting it over 100 then multiplying it by the £25 finds that 20% of £25 is £5

Ellie paid £8 less for the printer and £5 more for the hard drive.
Overall this is £3 less than Harry. Therefore Ellie is not correct



27

A shape is made by joining a right-angled triangle to a rectangle.

Not drawn
accurately

Work out the area of the shape.

[5 marks]

$$\frac{1}{2} \times 16 \times 30 = 240$$

Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$. The base of the triangle is 16cm and the height is 30cm

$$a^2 + b^2 = c^2$$

There is a missing side on the right-angled triangle so Pythagoras' Theorem can be used to find it

$$\sqrt{30^2 + 16^2}$$

The missing side is the longest side so is c . Rearranging to make c the subject finds that $c = \sqrt{a^2 + b^2}$. Substituting 30 for a and 16 for b

$$52 \times 34$$

The missing side is the width of the rectangle. Area of rectangle = length \times width. The length is 52cm and the width is 34cm

$$1768 + 240$$

Adding together the area of the rectangle and the area of the triangle gives the area of the shape

Answer 2008 cm²



28

Solve $5(2x - 1) = 6x + 9$

[3 marks]

$10x - 5 = 6x + 9$

Expanding the brackets on the left side

$4x - 5 = 9$

There is the least x on the right so subtracting the 6x from both sides

$4x = 14$

Adding 5 to both sides to eliminate the -5 and get the x term on its own

$x = \frac{14}{4}$

Dividing both sides by 4 gets x on its own. 14 cannot be divided by 4 to get a whole number so it can be left as a fraction

END OF QUESTIONS