

Wednesday 4 June 2025 – Morning

GCSE (9–1) Mathematics

J560/02 Paper 2 (Foundation Tier)

Time allowed: 1 hour 30 minutes



You must have:

- the Formulae Sheet for Foundation Tier (inside this document)

You can use:

- geometrical instruments
- tracing paper

Do not use:

- a calculator



Please write clearly in black ink. **Do not write in the barcodes.**

Centre number

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Candidate number

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First name(s)

Last name

INSTRUCTIONS

- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided. If you need extra space use the lined page at the end of this booklet. The question numbers must be clearly shown.
- Answer **all** the questions.
- Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.

INFORMATION

- The total mark for this paper is **100**.
- The marks for each question are shown in brackets [].
- This document has **20** pages.

ADVICE

- Read each question carefully before you start your answer.



Please note that these worked solutions have neither been provided nor approved by OCR and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue should be written in the exam.

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

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

1 Here is a list of numbers.

15 17 21 28 39 49

From this list, write down

(a) the prime number,

Prime numbers are only divisible by themselves and 1. 15 is divisible by 3, 21 is divisible by 3, 28 is divisible by 2, 39 is divisible by 3, 49 is divisible by 7

(a) 17..... [1]

(b) the square number,

$7^2 = 7 \times 7 = 49$, so 49 is a square number as it is the result of squaring a whole number greater than 0

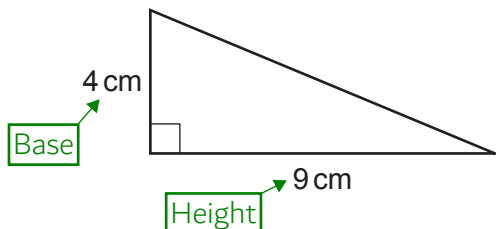
(b) 49..... [1]

(c) **two** numbers with a difference of 18.

Adding the difference of 18 to each number starting with the smallest until one of the numbers in the list is found. $15 + 18 = 33$, which is not in the list. $17 + 18 = 35$, which is not in the list. $21 + 18 = 39$, which is in the list. $39 - 21 = 18$ so 21 and 39 have a difference of 18

(c) 21..... and 39..... [1]

2 The diagram shows a right-angled triangle with base 9 cm and height 4 cm.



Not to scale

Work out the area of the triangle.

.....18..... cm² [2]

Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$. Halving the 4 cm gives 2 then multiplying this 2 by the 9 cm gives the area of 18 cm²

3 Work out, giving your answers as fractions.

(a) Half of $\frac{1}{2}$

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

'of' means to multiply

To multiply fractions: multiply the numerators and multiply the denominators

$$\frac{1}{4}$$

(a) [1]

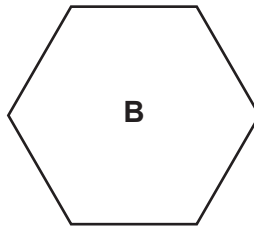
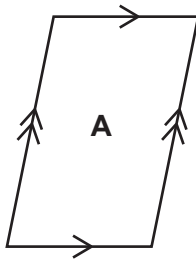
(b) $\frac{1}{5} + \frac{2}{5}$

Because the denominators are the same, the numerators can be added

$$\frac{3}{5}$$

(b) [1]

4 (a) Shape A and shape B are drawn below.



(i) Write down the mathematical name of each of the shapes.

2 pairs of parallel sides

(a)(i) Shape A Parallelogram

6-sided shape

Shape B Hexagon

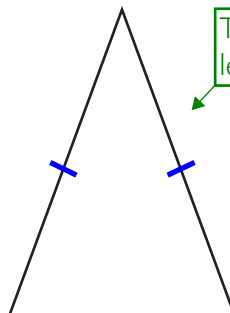
[2]

(ii) Write down the order of rotational symmetry of shape A.

A can be rotated 2 times within a full turn with it looking the same

(ii) 2 [1]

(b) Add correct notation to the shape below to show that it is an isosceles triangle.

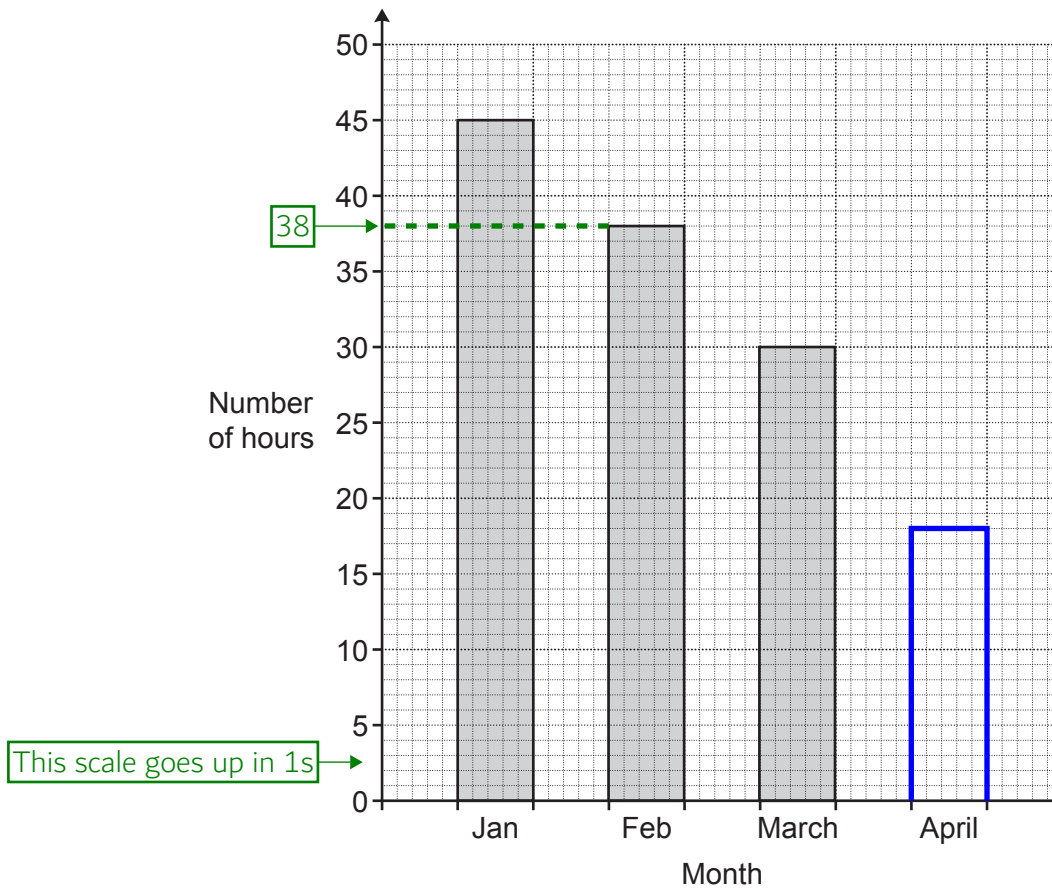


This indicates that the two sides are the same length. Isosceles triangles have two equal sides

[1]

Turn over

- 5 The bar chart shows the number of hours per month Riley spends at the gym in each of January, February and March.



- (a) How many hours did Riley spend at the gym in February?

(a) 38 hours [1]

- (b) Find how many **more** hours Riley spent at the gym in January compared to March.

45 - 30 ← Subtracting the 30 hours spent in March from the 45 hours spent in January

(b) 15 hours [2]

- (c) In April, Riley spent a total of 18 hours at the gym.

Complete the bar chart for April.

[1]

(d) Riley says,

I spent 50% less time at the gym in April than in March.

Is Riley correct?

Show how you decide.

$30 \div 2$

50% is $\frac{1}{2}$ as a fraction. Finding $\frac{1}{2}$ of the 30 hours spent in March finds that 50% of the time spent in March was 15 hours

$30 - 15$

Subtracting the value of 50% from the 30 hours spent in March finds that 50% less than the time spent in March is 15 hours

$15 \neq 18$

50% less than March was 15 hours, which is not 18 hours

No

Riley did not spend 50% less time at the gym in April than in March

Riley is because

..... [2]

6 (a) Work out.

(i) $10 - 2 \times 3$

$10 - 6$

The order of operations (BIDMAS) must be followed so the multiplication is done first

(a)(i) 4 [1]

(ii) $-1 + 3^2$

$-1 + 9$

The order of operations (BIDMAS) must be followed so the 3^2 is done first. $3^2 = 3 \times 3 = 9$

$9 - 1$

$-1 + 9$ is the same as $9 - 1$

(ii) 8 [1]

(b) Insert **one** pair of brackets to make this calculation correct.

$$6 \times (10 \div 2 - 4) = 6$$

Putting brackets here makes the $10 \div 2 - 4$ happen first. $10 \div 2 = 5$, then $5 - 4 = 1$, then $6 \times 1 = 6$

[1]

- 7 (a) Write $\frac{4}{5}$ as a decimal.

$$5 \overline{) 4.00} \begin{array}{l} 0.8 \\ 40 \\ 00 \end{array}$$

Dividing the numerator by the denominator converts the fraction to a decimal

(a) 0.8 [1]

- (b) Write 0.06 as a percentage.

$$0.06 \times 100$$

Multiplying a decimal by 100 converts it to a percentage

Moving the decimal point twice to the left multiplies by 100

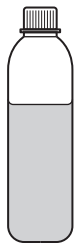
(b) 6 % [1]

- (c) Write $\frac{16}{3}$ as a mixed number.

Dividing the 16 by the 3 gives 5 with a remainder of 1. The 5 is the whole number and the remainder of 1 stays in the fraction

(c) $5\frac{1}{3}$ [1]

- 8 Bottle A contains 1.5 litres of water and bottle B contains 100 millilitres of water.



Bottle A
1.5 litres



Bottle B
100 millilitres

Not to scale

Water is poured from bottle A into bottle B until both bottles contain the same amount.

How many millilitres of water are poured from bottle A into bottle B?

$$1.5 \times 1000$$

1 litre = 1000 millilitres. So multiplying the 1.5 litres by 1000 converts it to 1500 millilitres

$$1500 - 100$$

Subtracting the 100 millilitres in B from the 1500 millilitres in A finds that the difference is 1400 millilitres

$$2 \overline{) 1400}$$

Dividing the 1400 millilitres difference by 2 finds that half of the difference is 700 millilitres. This must needs to be taken out of A and put into B so that they have the same amount

..... 700 ml [3]

9 (a) Simplify.

$$4x - 3y + x + 7y$$

Collecting like terms. $4x + x = 5x$ and $-3y + 7y = 7y - 3y = 4y$

(a) $5x + 4y$ [2]

(b) Multiply out.

(i) $5(2 - x)$

$5 \times 2 = 10$ and $5 \times -x = -5x$

(b)(i) $10 - 5x$ [1]

(ii) $2x(x + 3)$

$2x \times x = 2x^2$ and $2x \times 3 = 6x$

(ii) $2x^2 + 6x$ [2]

10 By writing each number correct to 1 significant figure, find an estimate for this calculation.

$$\frac{3.81 \times 19.8}{2.1}$$

$\frac{4 \times 20}{2}$ ← Rounding each number correct to 1 significant figure

$\frac{80}{2}$ ← $4 \times 20 = 80$

$80/2 = 40$

..... 40 [3]

- 11 Leo and Eve attempt the same puzzle.
 Leo takes 1 minute 15 seconds to solve the puzzle.
 Eve takes 2 minutes 5 seconds to solve the puzzle.

Write Leo's time as a fraction of Eve's time.
 Give your answer in its simplest form.

$60 + 15 = 75$

1 minute = 60 seconds. Adding 60 seconds and the 15 seconds for Leo finds that Leo takes 75 seconds

$60 + 60 + 5 = 125$

1 minute = 60 seconds. Adding two lots of 60 seconds and the 5 seconds finds that Eve takes 125 seconds

$25, 50, 75, 100, 125$

Both 75 and 125 are in the 25 times table. Listing the 25 times table to work out how many lots of 25 they are

The fraction was $75/125$. Dividing both the numerator and denominator by 25 gives $3/5$. This cannot go simpler as 3 and 5 cannot be divided by the same amount to get smaller whole numbers

$$\frac{3}{5}$$

..... [3]

- 12 (a) A straight line has equation $y = 5x + 2$.

(i) Write down the gradient of the line.

The general equation of a straight line is $y = mx + c$, where m is the gradient. m is 5 so the gradient is 5

(a)(i) 5 [1]

(ii) Find the value of y when $x = 7$.

5×7

Substituting 7 for x in $5x$ finds that the value of the $5x$ is 35 when $x = 7$

$35 + 2$

Adding the 2 to the value of the $5x$ finds that $y = 37$

(ii) 37 [1]

(b) Make x the subject of $y = 5x + 2$.

$y - 2 = 5x$

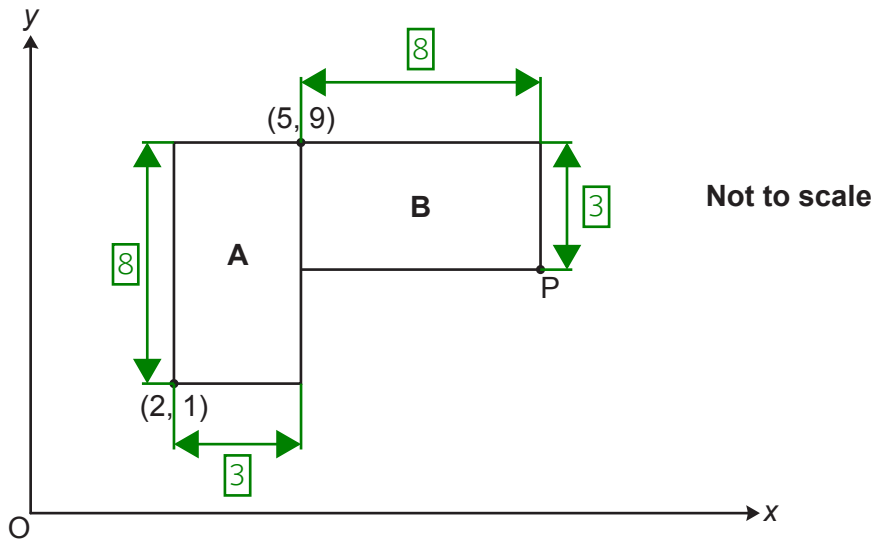
Subtracting 2 from both sides eliminates the +2 on the right and gets the x term on its own

Dividing both sides by 5 to get x on its own

$$x = \frac{y - 2}{5}$$

(b) [2]

- 13 The diagram shows rectangle **A** and rectangle **B**.
Rectangle **A** has two labelled vertices at the points (2, 1) and (5, 9).



Rectangle **A** is rotated 90° anticlockwise around the centre (5, 9) to form rectangle **B**.

Find the coordinates of the vertex marked P.

$$5 - 2 = 3$$

Subtracting the x-coordinate of (2, 1) from the x-coordinate of (5, 9) finds that the width of the rectangle is 3

$$9 - 1 = 8$$

Subtracting the y-coordinate of (2, 1) from the y-coordinate of (5, 9) finds that the length of the rectangle is 8

$$5 + 8$$

Adding a length of the rectangle to the x-coordinate of (5, 9) finds that the x-coordinate of P is 13

$$9 - 3$$

Subtracting a width of the rectangle from the y-coordinate of (5, 9) finds that the y-coordinate of P is 6

(13 , 6) [3]

- 14 (a) Sundip has some £5, £10, £20 and £50 bank notes.
She buys 30 litres of fuel for her car.
One litre of fuel costs £1.50.

Sundip pays the exact amount of money for the fuel using three bank notes.

Work out the three bank notes that she uses to pay for the fuel.

$$\begin{array}{r} 1.50 \\ \times 30 \\ \hline 45.00 \\ 1 \end{array}$$

← Multiplying the cost of 1 litre of fuel by 30 finds that the cost of the 30 litres of fuel is £45

£20, £20 and £5 are three bank notes which add up to £45

(a) £ 20....., £ 20..... and £ 5..... [3]

- (b) On one journey, Sundip's car uses fuel at a rate of one litre every 16 kilometres.
At the start of the journey, her car has 50 litres of fuel.
At the end of the journey, her car has used $\frac{7}{10}$ of this fuel.

Use the conversion 5 miles = 8 kilometres to work out the number of **miles** Sundip travels on this journey.

You must show your working.

$$50 \div 10$$

← Dividing the 50 litres by 10 finds that $1/10$ of this fuel is 5 litres

$$5 \times 7$$

← Multiplying the value of $1/10$ of this fuel by 7 finds that $7/10$ of this fuel is 35 litres. So 35 litres of fuel was used

$$\begin{array}{r} 35 \\ \times 16 \\ \hline 210 \\ 350 \\ \hline 560 \end{array}$$

← Multiplying the 35 litres by the 16 kilometres travelled for every 1 litre finds that 560 kilometres were travelled

$$560 \div 8$$

← Dividing the 560 kilometres by 8 finds that it is 70 lots of 8 kilometres

$$70 \times 5$$

← The distance travelled is 70 lots of the 8 kilometres so must be 70 lots of the 5 miles

(b) 350..... miles [5]

15 Work out.

(a) -3.5×-4

$$\begin{array}{r} 3.5 \\ \times 4 \\ \hline 14.0 \\ 2 \end{array}$$

← $3.5 \times 4 = 14$, so $-3.5 \times -4 = -14$, which is the same as 14 as the negatives cancel out

(a) 14 [1]

(b) $0.1 \div 0.4$

Multiplying both the 0.1 and the 0.4 by 10 gives $1 \div 4$, which is an equivalent division. This can be left as a fraction

$$\frac{1}{4}$$

(b) $\frac{1}{4}$ [1]

- 16 An examination has two parts.
A student scores 10 out of 15 marks on Part 1.
They score 4 out of 10 marks on Part 2.

To pass the examination the student needs to score 54% of the total marks.

Show that the student passes the examination.

[3]

$10 + 4 = 14$ ← Adding the 10 and 4 marks scored finds that the student scores 14 marks in total

$15 + 10 = 25$ ← Adding the 15 and 10 available finds that the total marks is 25

$$\begin{array}{r} 14 \\ \times 4 \\ \hline 56 \\ 1 \end{array}$$

$\frac{14}{25} = \frac{56}{100} = 56\%$ ← 14 out of 25 is scored. This is $14/25$ as a fraction. Multiplying both the numerator and denominator by 4 gives $56/100$, which is equivalent to 56%. The student passes as 56% is more than the 54% needed

17 Solve.

$$2x - 1 \leq 11$$

$$2x \leq 12 \quad \leftarrow \text{Adding 1 to both sides eliminates the -1 on the left and gets the x term on its own}$$

Dividing both sides by 2 eliminates the 2 on the left and gets x on its own

$$x \leq 6 \quad \text{..... [2]}$$

$$18 \quad 1\frac{1}{5} + \frac{22}{d} = 1\frac{3}{4}$$

Find the value of d .

$$\frac{1}{5} + \frac{22}{d} = \frac{3}{4} \quad \leftarrow \text{Subtracting 1 from both sides cancels out the whole numbers from both sides}$$

$$\frac{22}{d} = \frac{3}{4} - \frac{1}{5} \quad \leftarrow \text{Subtracting } 1/5 \text{ from both sides cancels out the } 1/5 \text{ on the left and gets the term involving } d \text{ on its own}$$

$$= \frac{15}{20} - \frac{4}{20} \quad \leftarrow \text{Multiplying both the numerator and denominator of } 3/4 \text{ by 5 and multiplying both the numerator and denominator of } 1/5 \text{ by 4 makes the denominator of both fractions 20}$$

$$= \frac{11}{20} \quad \leftarrow \text{The numerators can be subtracted and the denominator stays the same}$$

$$= \frac{22}{40} \quad \leftarrow \text{Multiplying both the numerator and denominator by 2 gets the same numerator as on the left}$$

$$22/d = 22/40. \text{ So } d \text{ must be } 40$$

$$d = 40 \quad \text{..... [3]}$$

- 19 Sara and Tom both make a sequence of numbers.
The first term in both sequences is 10.

The term-to-term rule for Sara's sequence is add 14.
The term-to-term rule for Tom's sequence is add 35.

Each sequence stops when a term reaches or goes above 500.

- (a) Find the **number of terms** that are the same in both Sara's and Tom's sequence.
You must show your working.

$$2 \times 7 \leftarrow \text{Expressing 14 as a product of its prime factors}$$

$$5 \times 7 \leftarrow \text{Expressing 35 as a product of its prime factors}$$

$$2 \times 5 \times 7 \leftarrow \text{The lowest common multiple of 14 and 35 is found by multiplying the highest power of each prime number in both lists. So the lowest common multiple of 14 and 35 is 70}$$

$$10, 80, 150, 220, 290, 360, 430, 500$$

Listing the terms which appear in both sequences. They both start with 10 and will have the same term every 70. So starting with 10 and counting in 70s and stopping at 500 as the sequences do not go above 500

There are 8 terms in the list

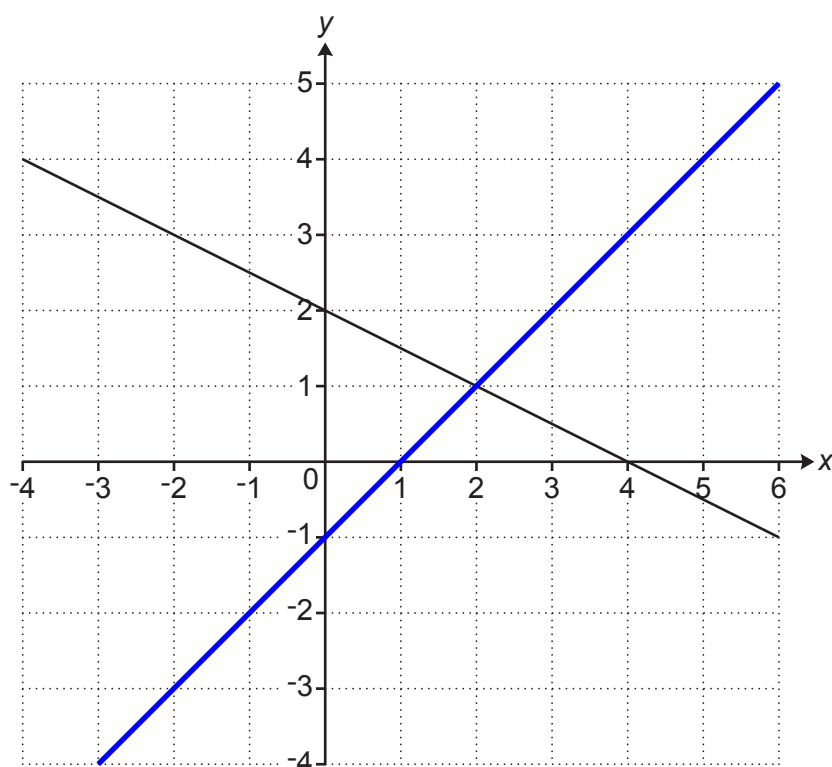
(a) 8 [4]

- (b) Find an expression for the n th term of Sara's sequence.

The sequence increases by 14 between each term so must involve $14n$. Going backward in the sequence finds that the 0th term (the term before the 1st term) would be -4 as $10 - 14 = -4$. So the n th term is $14n - 4$

(b) $14n - 4$ [2]

- 20 The graph of the line $y = 2 - \frac{1}{2}x$ is shown on this grid.



By drawing a suitable line on the grid, solve these simultaneous equations.

$$y = 2 - \frac{1}{2}x \text{ and } y = x - 1$$

Drawing the graph of $y = x - 1$. The general equation of a straight line is $y = mx + c$, where m is the gradient and c is the y -intercept. So the gradient is 1 (meaning that it goes up 1 for every 1 it goes to the right) and the y -intercept is -1

Where the two graphs cross are the solutions to the simultaneous equations. They cross at $(2, 1)$. So $x = 2$ and $y = 1$

$x = \dots\dots\dots 2$

$y = \dots\dots\dots 1$

[4]

- 21 Three lengths of wood are in the ratio 2 : 5 : 7.
The difference in size between two of the lengths of wood is 30 cm.

Kofi says,

The sum of the three lengths of wood **must be** at least 120 cm.

Is Kofi correct?

Show how you decide.

$$7 - 2$$

The 30 cm could be the difference between the longest and shortest length of wood. This has the greatest number of parts difference so will make each part of the ratio worth the least. Subtracting the 2 parts for the shortest from the 7 parts for the longest finds that 5 parts of the ratio could represent the 30 cm

$$30 \div 5 = 6$$

Dividing the 30 cm by the 5 parts finds that 1 part of the ratio would be worth 6 cm

$$2 + 5 + 7$$

Adding the numbers of parts in the ratio finds that the total length of the wood is represented by 14 parts of the ratio

$$\begin{array}{r} 14 \\ \times 6 \\ \hline 84 \end{array}$$

Multiplying the value of 1 part of the ratio by the 14 parts finds that the sum of the three lengths of wood could be as low as 84 cm

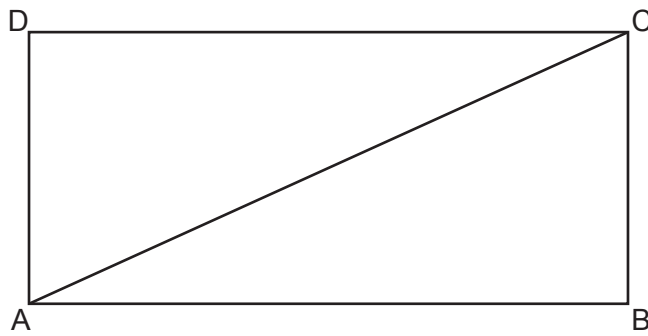
No

The 84 cm is not at least 120 cm, so the sum of the three lengths of wood does not have to be at least 120 cm

Kofi is because

..... [5]

- 22 The diagram shows a rectangle ABCD with diagonal AC.



Not to scale

Complete each statement to show that triangle ABC is congruent to triangle ADC.

Angle ADC = angle $\angle ABC$ because both angles are 90° .

Side AD = side BC because opposite sides of a rectangle are equal.

Side CD = side AB because opposite sides of a rectangle are equal

The above three statements show that triangle ABC is congruent to triangle ADC because

of SAS

Two sides and the angle between them are the same in both triangles. So they must be congruent (the same shape and size)

[4]

- 23 Work out.

$$2^{-4}$$

$2 \times 2 \times 2 \times 2$ ← Expressing 2^4

$2 \times 2 = 4$, then $4 \times 2 = 8$, then $8 \times 2 = 16$. The negative power means to do the reciprocal (1 over or flip the fraction)

$$\frac{1}{16}$$

[2]

24 A school has three terms, Autumn, Spring and Summer.

In class A there were 90 absences in the Autumn term, 120 absences in the Spring term and 40 absences in the Summer term.

Compared to class A, class B had:

- $\frac{3}{10}$ fewer absences in the Autumn term
- 5% more absences in the Spring term
- 7 more absences in the Summer term.

Design and complete a two-way table to show this information.

[6]

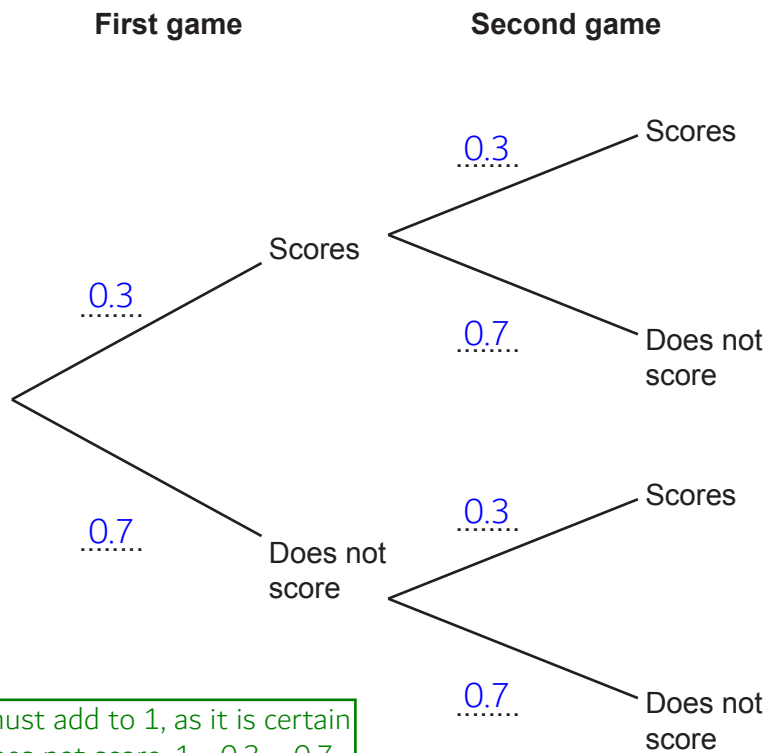
$90 \div 10$ ← This finds that $1/10$ of the absences in the Autumn term for class A is 9
 9×3 ← Multiplying the value of $1/10$ by 3 finds that $3/10$ of the absences in the Autumn term for class A is 27
 $90 - 27 = 63$ ← Subtracting the value of $3/10$ from the 90 finds that there were 63 absences in the Autumn term for class B
 $120 \div 10$ ← This finds that 10% of the absences in the Spring term for class A is 12
 $12 \div 2$ ← 5% is half of 10% so this finds that 5% of the absences in the Spring term for class A is 6
 $120 + 6 = 126$ ← Adding the value of 5% to the 120 finds that there were 126 absences in the Spring term for class B
 $40 + 7 = 47$ ← Adding 7 to the 40 finds that there were 47 absences in the Summer term for class B

	Autumn	Spring	Summer
A	90	120	40
B	63	126	47

← Completing a two-way table. There is no need to include the totals at the end of each row and column

- 25 Casey plays two games of football.
In each game, the probability that Casey scores a goal is 0.3 .

(a) Complete the tree diagram.



Each set of branches must add to 1, as it is certain that Casey scores or does not score. $1 - 0.3 = 0.7$

[2]

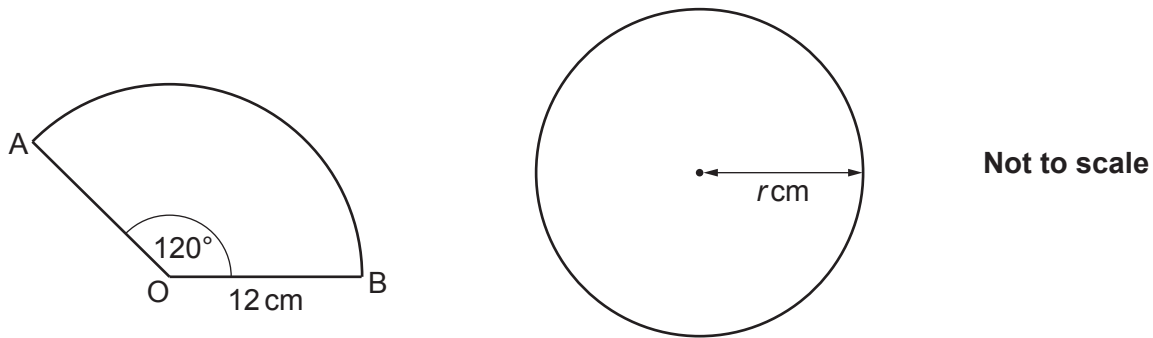
(b) Work out the probability that Casey scores in only one of the games.

$$0.3 \times 0.7 + 0.7 \times 0.3$$

Scores AND does not score OR does not score AND scores. AND means to multiply the probabilities. OR means to add the probabilities

(b) 0.42..... [3]

26 The diagram shows a sector of a circle AOB and a circle with radius r cm.



The sector has radius 12 cm and angle $AOB = 120^\circ$.

The ratio of the area of the sector AOB to the area of the circle is 3 : 4.

Calculate the value of r .

You must show your working.

$$\frac{120}{360} = \frac{12}{36} = \frac{1}{3}$$

There are 360° around the centre of a circle. There are 120° out of these 360° for the sector. Expressing the sector as a fraction of a circle then simplifying it to $1/3$. So the sector is $1/3$ of a full circle

$$\pi \times 12^2$$

Area of circle = $\pi \times \text{radius}^2$. So the area of the full circle would be $144\pi \text{ cm}^2$

$$3 \overline{) 144} \begin{array}{r} 048 \\ 144 \\ \hline 000 \end{array}$$

The sector is $1/3$ of the full circle so dividing the area by 3 finds that the area of the sector is $48\pi \text{ cm}^2$

$$3 \overline{) 48} \begin{array}{r} 16 \\ 48 \\ \hline 00 \end{array}$$

The area of the sector is represented by 3 parts of the ratio. So dividing the area of the sector by 3 finds that 1 part of the ratio is worth $16\pi \text{ cm}^2$

$$\begin{array}{r} 16 \\ \times 4 \\ \hline 64 \end{array}$$

Multiplying the value of 1 part of the ratio by the 4 parts representing the circle finds that the area of the circle is $64\pi \text{ cm}^2$

$$\pi r^2 = 64\pi$$

Area of circle = $\pi \times \text{radius}^2$. Setting this equal to the $64\pi \text{ cm}^2$

$$r^2 = 64$$

Dividing both sides by π

Square rooting both sides finds that $r = 8$

$$r = \dots\dots\dots 8 \dots\dots\dots [6]$$

END OF QUESTION PAPER

[illegible]

.CG Maths.