YEAR 7 MATHEMATICS CHALLENGE

Heat 1, via *Livestorm*

Tuesday 25th February 2025

William Thallon, Secondary Mathematics Adviser

Madeline Hyles, Secondary Team

FORMAT OF CHALLENGE

Round 1	General Maths questions
Round 2	Memory Round
Round 3	Estimation Round
Round 4	General Maths questions

60 marks for each round

PRELIMINARIES

- You should have pens or pencils, rubbers, and rough working out paper only.
- No calculators, no measuring equipment, and no use of computers, phones, Internet etc!
- Decide on a team name. It should include the name of your school (e.g. Leventhorpe Team A).
- Don't leave any answers blank. 'Near misses' or partially correct answers may score points.

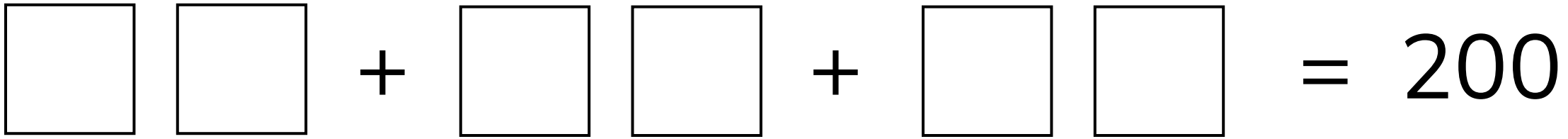
Round 1

General Mathematics Questions

90 seconds for each question

ROUND 1, QUESTION 1

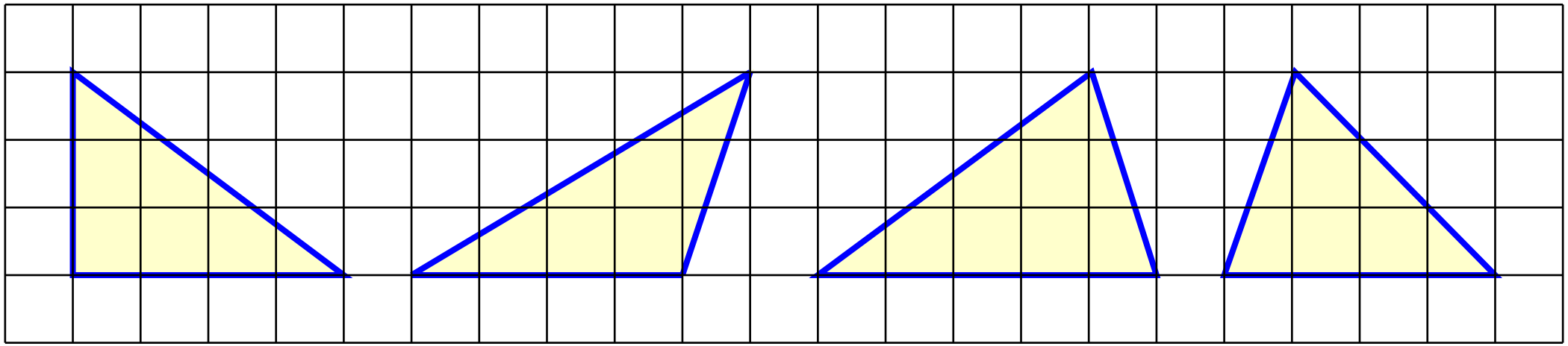
Use six **different** digits from **1 to 9** to complete this sum:



On the *Google* sheet, enter one digit in each cell.

ROUND 1, QUESTION 2

Here are four triangles drawn on a centimetre square grid.



One triangle has a different area from the other three.

Which triangle is the ‘odd one out’, and what is its area?

ROUND 1, QUESTION 3

The sum of five consecutive integers is **235**.

What is the **smallest** of these integers?

ROUND 1, QUESTION 4

20% of 20% of a number is 6.

What is the number?

ROUND 1, QUESTION 5

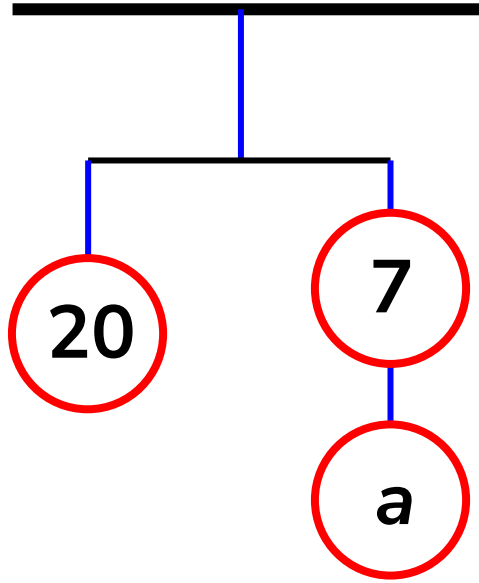
Aaron takes an online arithmetic test every week. Each test is out of 20.

His first four scores are 2, 1, 5 and 2.

He does much better in the fifth test. His mean score after five tests is double his mean score after four tests.

Work out his score in the fifth test.

ROUND 1, QUESTION 6



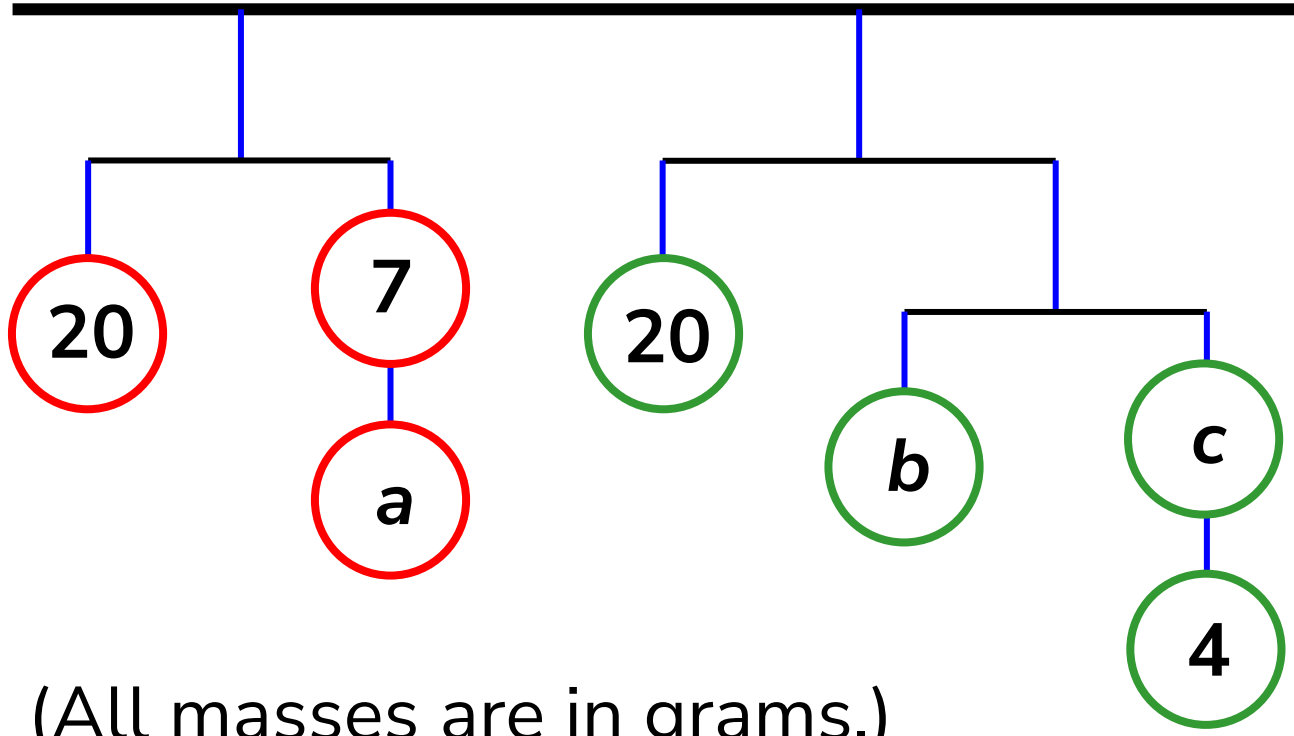
(All masses are in grams.)

This is a mobile, hanging from a horizontal ceiling.

The vertical lines are strings. The horizontal line is a light piece of wood.

There are objects hanging from the mobile, so that it is perfectly balanced. The mass of each object is given.

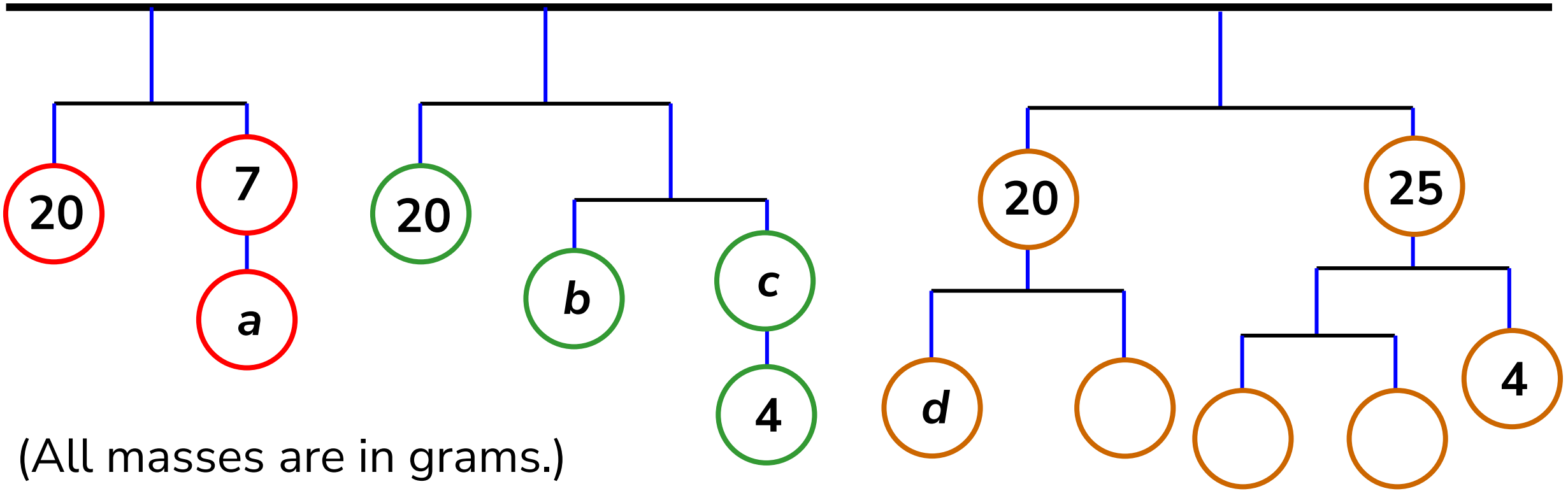
ROUND 1, QUESTION 6



(All masses are in grams.)

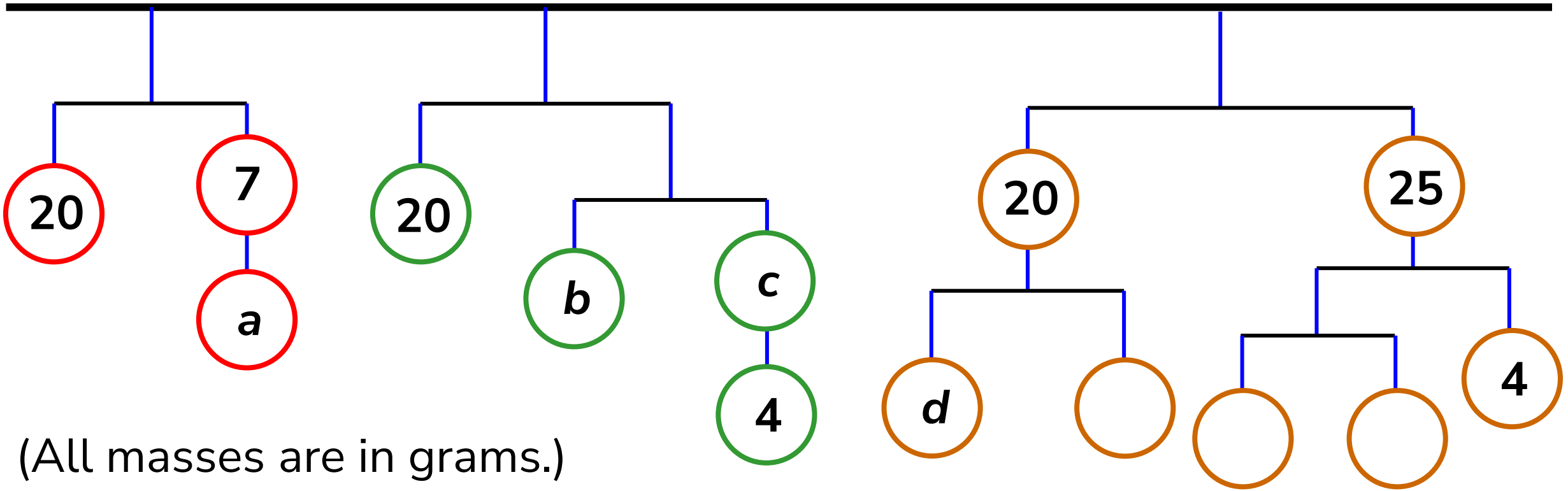
Here is a second mobile, and there is a third one on the next screen.

ROUND 1, QUESTION 6



(All masses are in grams.)

ROUND 1, QUESTION 6



(All masses are in grams.)

Find the masses of the objects marked *a*, *b*, *c* and *d*.

End of Round 1

Please finalise your answers, and pass them to your teachers for entry onto the *Google* sheet.

ANSWERS TO ROUND 1

ROUND 1, QUESTION 1

Use six **different** digits from **1 to 9** to complete this sum:

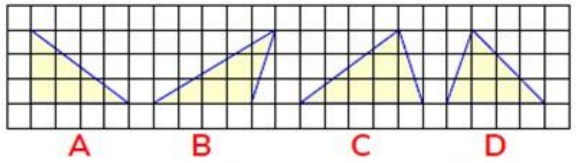
□□ + □□ + □□ = 200

On the Google sheet, enter one digit in each cell.

(e.g.) 95+71+34

ROUND 1, QUESTION 2

Here are four triangles drawn on a centimetre square grid.



One triangle has a different area from the other three.

Which triangle is the 'odd one out', and what is its area?

C, 7.5 cm²

ROUND 1, QUESTION 3

The sum of five consecutive integers is **235**.

What is the **smallest** of these integers?

45

ROUND 1, QUESTION 4

20% of 20% of a number is 6.

What is the number?

150

ROUND 1, QUESTION 5

Aaron takes an online arithmetic test every week. Each test is out of 20.

His first four scores are 2, 1, 5 and 2.

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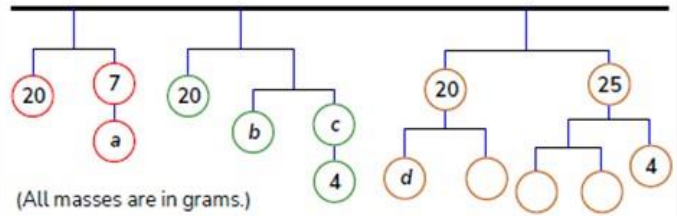
Work out his score in the fifth test.

15

ROUND 1, QUESTION 6



(All masses are in grams.)

Find the masses of the objects marked *a*, *b*, *c* and *d*.

***a* = 13, *b* = 10, *c* = 6, *d* = 6.5**

Round 2

Memory Round

ROUND 2

We are going to show a mathematical poster to two members of the team (the **observers**).

The other two members of the team (the **artists**) will not see the poster. The observers must describe the poster from memory, and the artists must draw it.

The observers are not allowed to draw the poster, or make notes when they are looking at the poster.

When describing the poster, observers must use words only. They are not allowed to draw anything, or use their hands in any way.

ROUND 2

The poster will be shown on the screen. The artists must go into a different room, so they cannot see it.

The observers will have **four** chances to view the poster.

30 seconds to view
2 minutes to go and describe

30 seconds to view
2 minutes to describe

30 seconds to view
2 minutes to describe

30 seconds to view
2 minutes to describe

Artists can draw at any time during the whole period.

ROUND 2

Hint for the observers

Don’t try to memorise the entire poster at once. The poster is in a number of sections, so focus on one or two parts at a time.

Note to the artists

Place your piece of paper in **landscape** orientation (i.e. the same way up as the screen you are currently looking at).

ROUND 2

Note to supervising teachers

Each showing of the poster will be preceded by a 30-second warning, so that the observers can get themselves into position.

At the end, the finished poster should be photographed or scanned and sent in by e-mail.

(E-mail address to follow at end of round.)

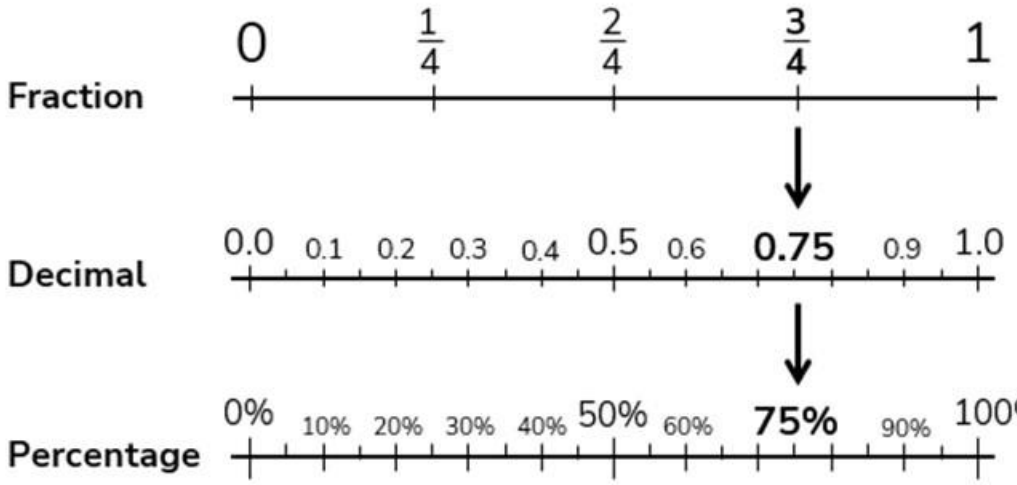
ROUND 2

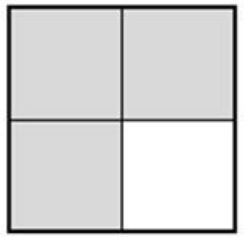
Pencils and rubbers only. No rulers or other drawing equipment.

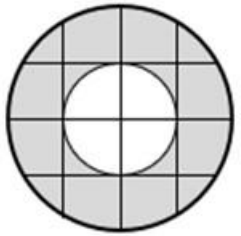
You now have one minute to decide who will be the observers and who will be the artists ... and to get into position!

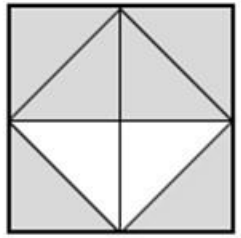
ROUND 2

Poster about to be displayed for the first time.



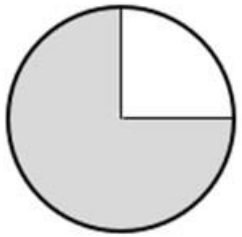


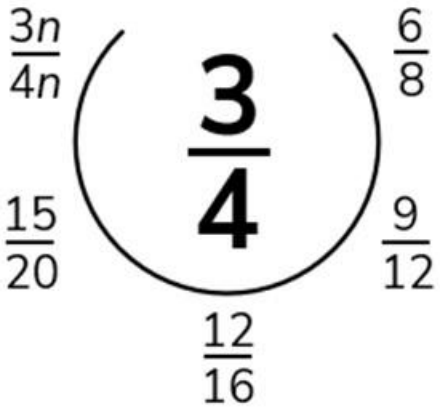


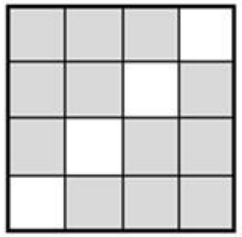


$\frac{3}{4}$ of an hour

= 45 minutes

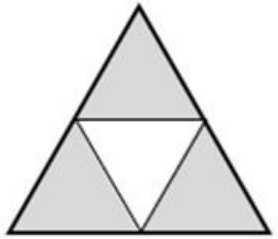






$\frac{3}{4}$ of a turn

= 270°



Sums of unit fractions

$$\frac{3}{4} = \frac{1}{2} + \frac{1}{4}$$

$$= \overbrace{\frac{1}{3} + \frac{1}{6}} + \frac{1}{4}$$

$$= \frac{1}{3} + \frac{1}{6} + \overbrace{\frac{1}{5} + \frac{1}{20}}$$

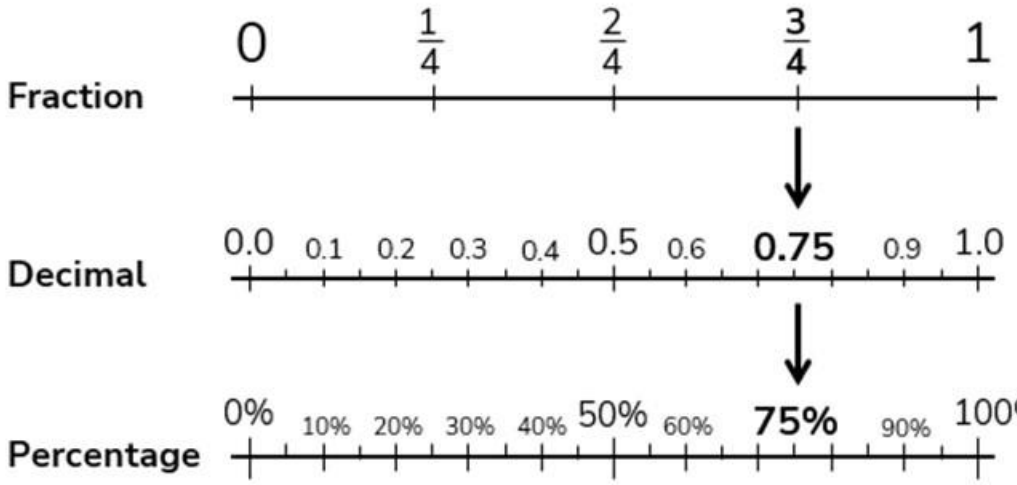
$$= \overbrace{\frac{1}{4} + \frac{1}{12}} + \frac{1}{6} + \frac{1}{5} + \frac{1}{20}$$

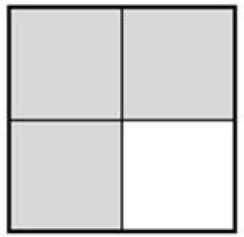
Round 2

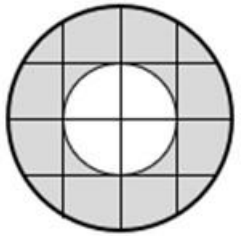
Memory Round

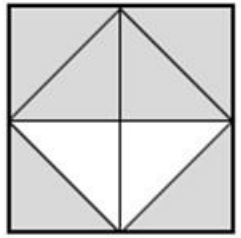
ROUND 2

Second viewing of poster coming up!









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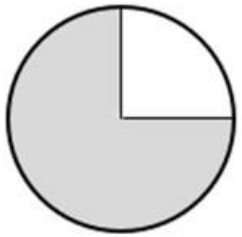

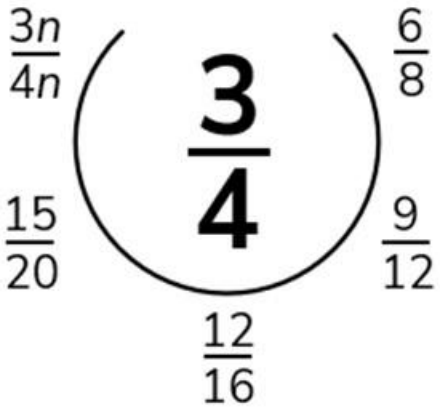

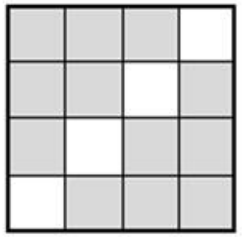

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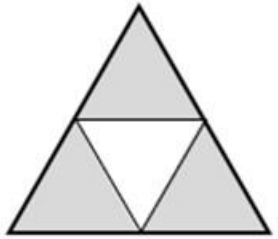

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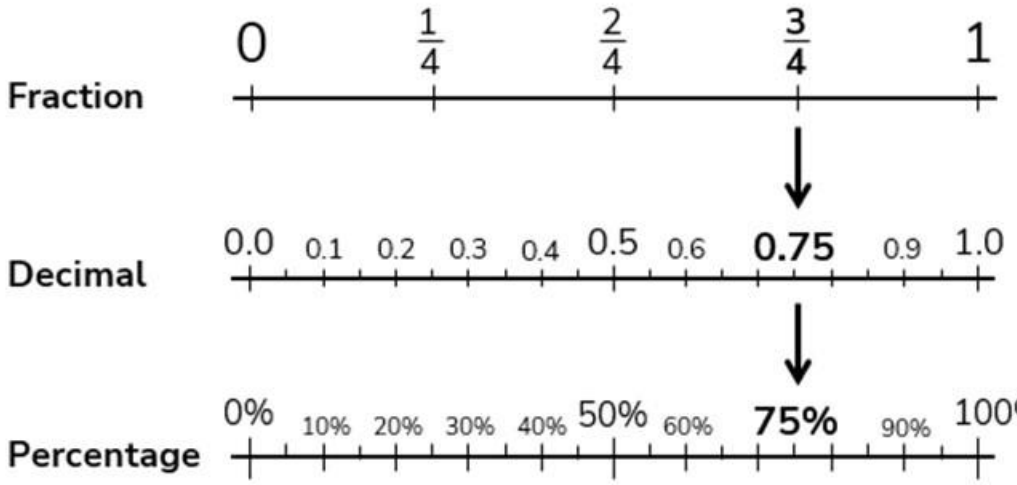
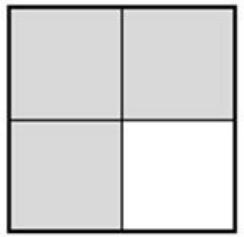
Round 2

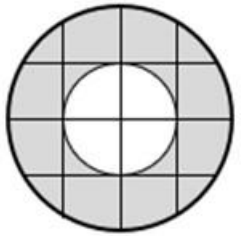
Memory Round

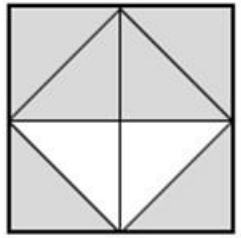
ROUND 2

Third viewing of poster coming up!









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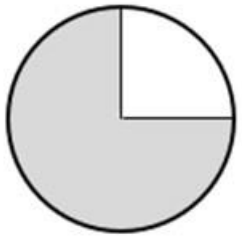
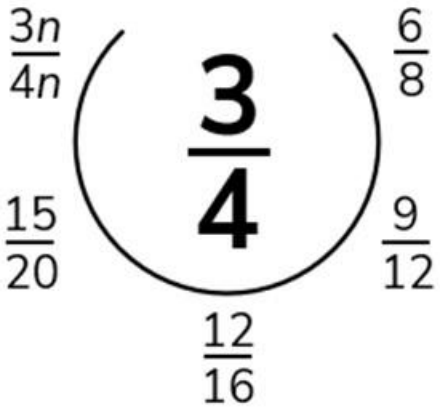
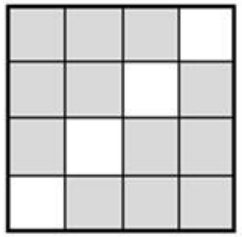
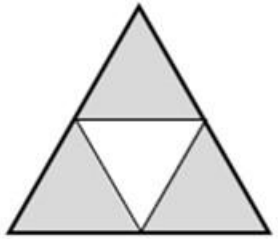






$\frac{3}{4}$ of a turn

= 270°



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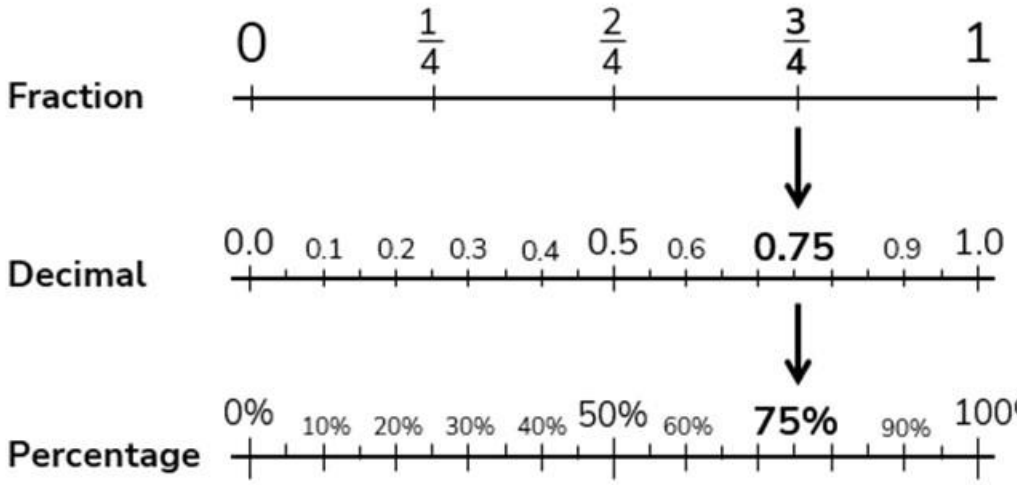
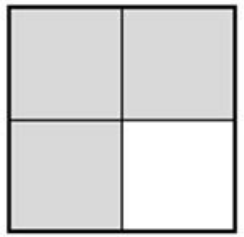
Round 2

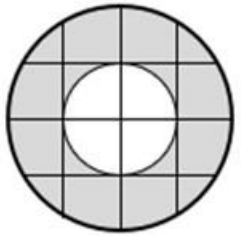
Memory Round

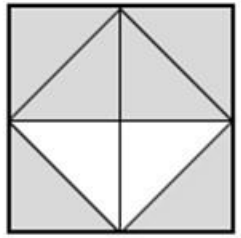
ROUND 2

Fourth and final viewing of poster coming up!









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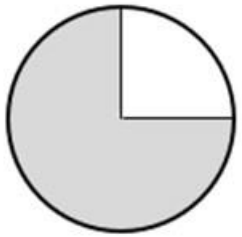

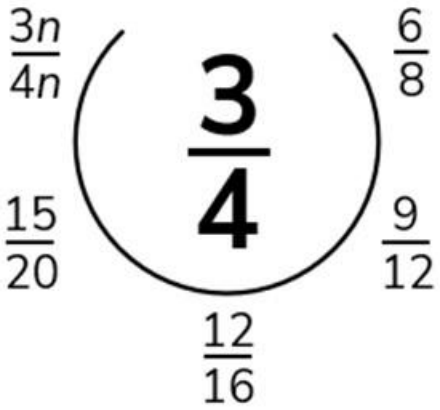

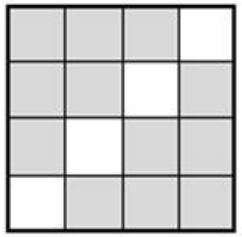

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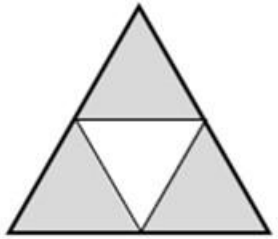

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Round 2

Memory Round

ROUND 2

Time’s up!

Everyone should now come back into the main room.

Please photograph or scan the finished poster, and e-mail it to:

madeline.hyles@hfleducation.org

End of Round 2

A reminder of the e-mail address to send the finished posters to:

madeline.hyles@hfleducation.org

Round 3

Estimation Round

90 seconds for each question

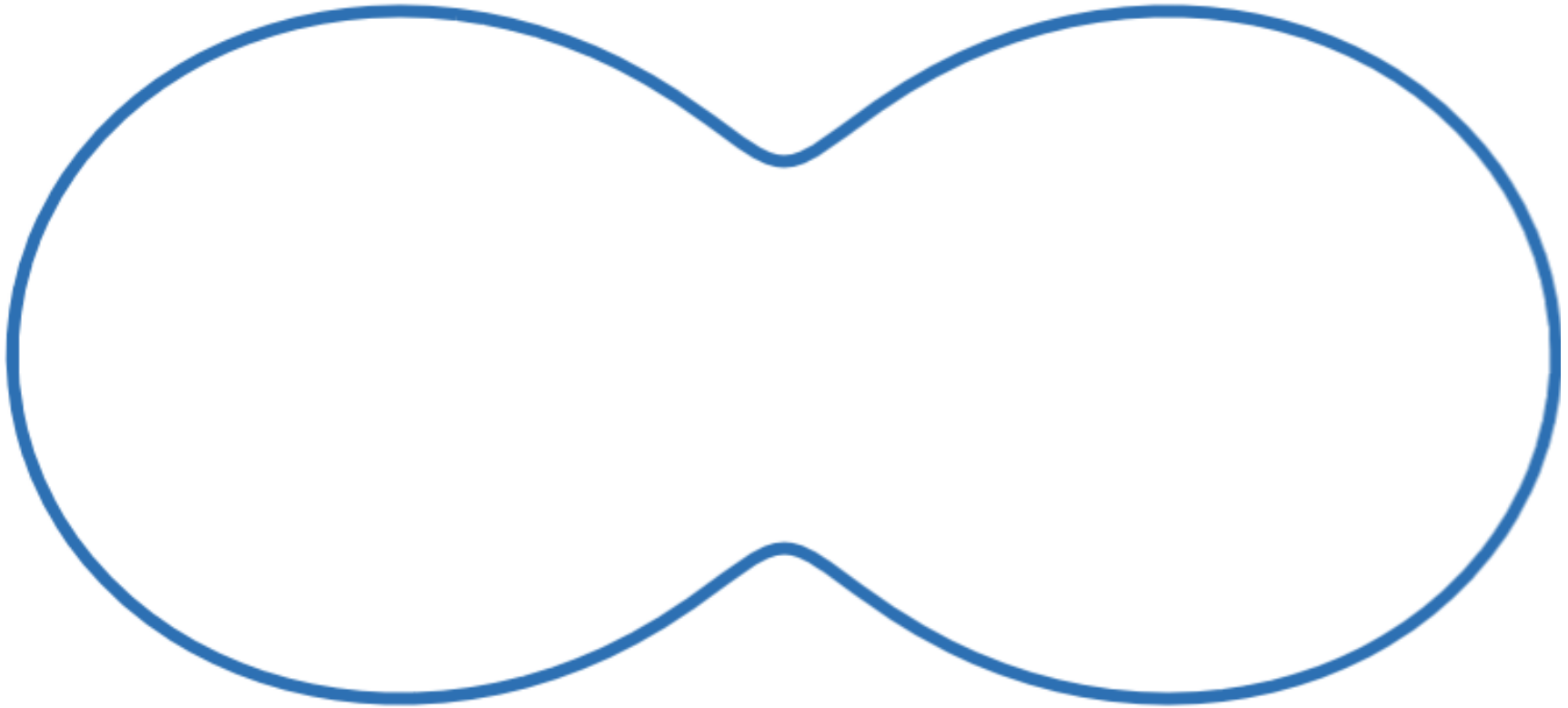
ROUND 3, QUESTION 1

The adult male sitting on the bench is of average height.

Estimate the height of the tree, in metres.

(from the ground to the highest leaf)

ROUND 3, QUESTION 2



1 cm²

Estimate the area of this shape in cm²

ROUND 3, QUESTION 3

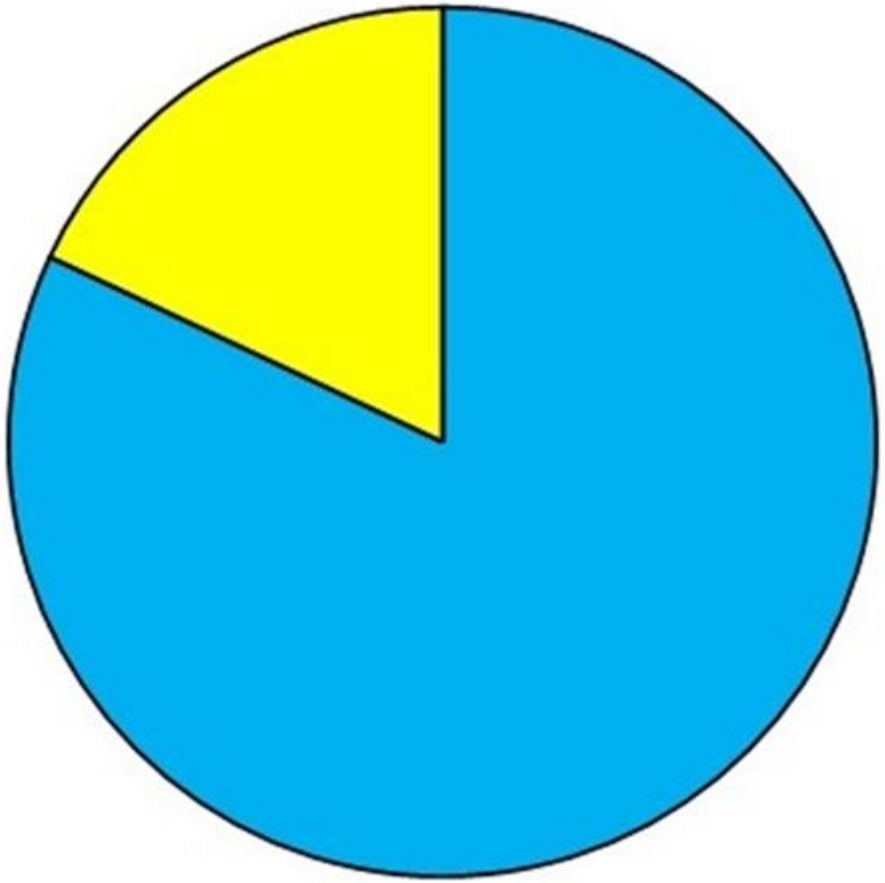
Place these calculations in increasing order of their value.

A	B	C	D
$\sqrt{410}$	$\frac{161}{0.84}$	$(21.6 - 9.71)^2$	6.35×8.127

On the *Google* sheet, enter one letter per cell, for example:

D	C	B	A

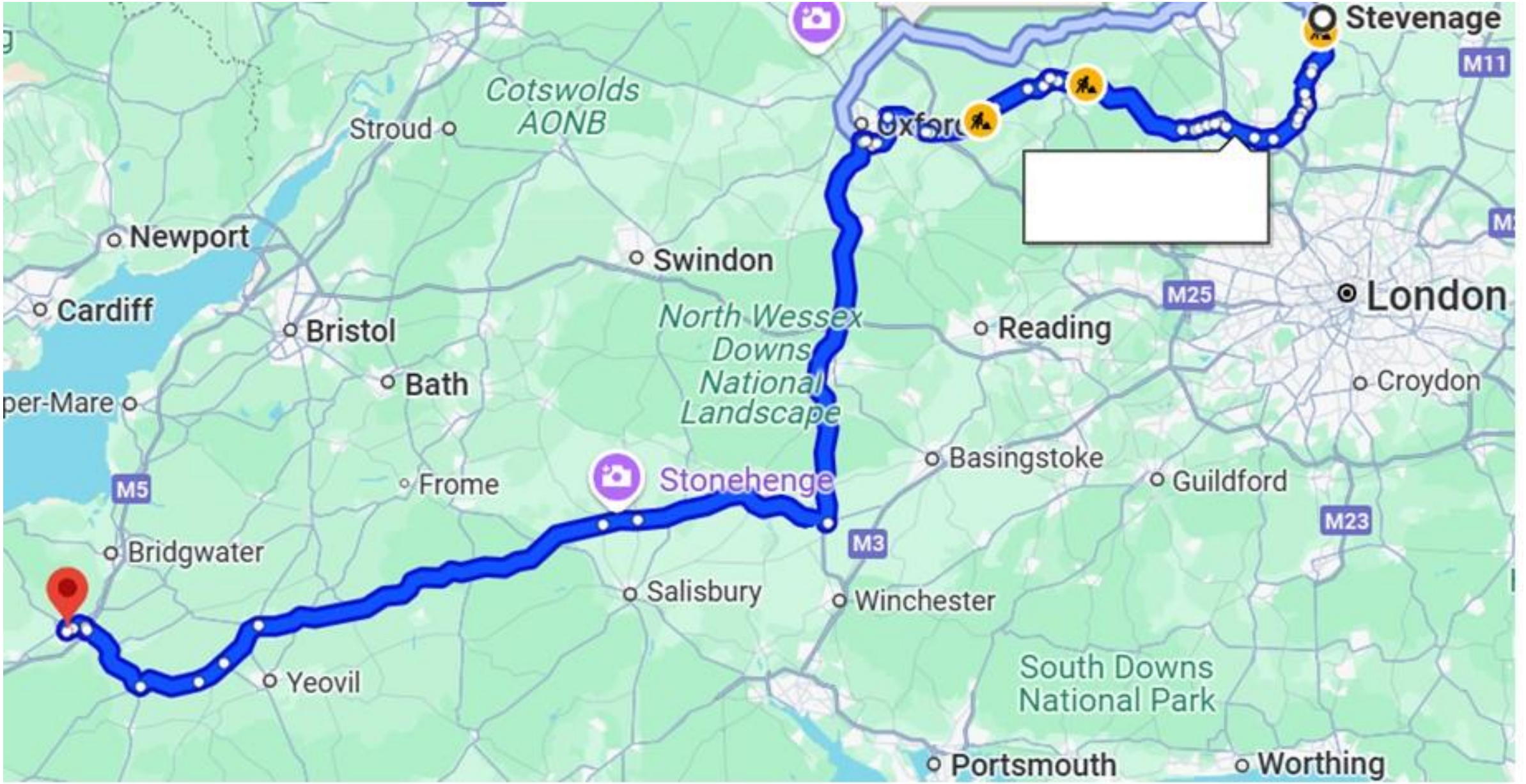
ROUND 3, QUESTION 4



Estimate the percentage of this pie chart shaded blue

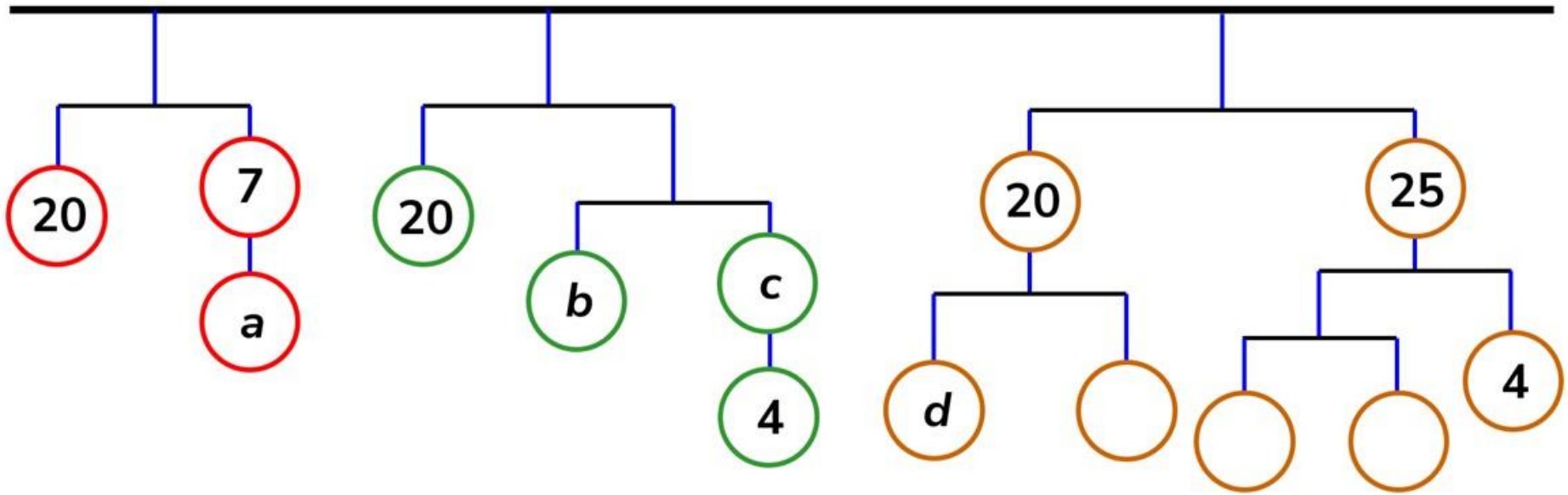
ROUND 3, QUESTION 5

Estimate the length of the blue route shown on the map, in km.


Stevenage
M11
Cotswolds AONB
Stroud
Oxford
Newport
Swindon
M25
London
Cardiff
Bristol
North Wessex Downs National Landscape
Reading
Bath
Croydon
per-Mare
Basingstoke
Stonehenge
Guildford
M5
Frome
M23
M3
Bridgwater
Salisbury
Winchester
Yeovil
South Downs National Park
Portsmouth
Worthing
20 km

ROUND 3, QUESTION 6

Earlier in the challenge, you saw these ‘mobiles’.



Estimate the number of minutes since they first appeared on the screen.

End of Round 3

Please finalise your answers, and pass them to your teachers for entry onto the *Google* sheet.

ANSWERS TO ROUND 3

ROUND 3, QUESTION 1

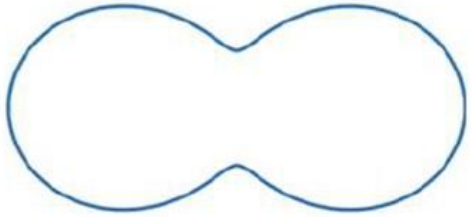
The adult male sitting on the bench is of average height.

Estimate the height of the tree, in metres.

(from the ground to the highest leaf)

3.5 to 3.9

ROUND 3, QUESTION 2



Estimate the area of this shape in cm²

83 to 103

ROUND 3, QUESTION 3

Place these calculations in increasing order of their value.

A	B	C	D
$\sqrt{410}$	$\frac{161}{0.84}$	$(21.6 - 9.71)^2$	6.35×8.127

On the *Google* sheet, enter one letter per cell, for example:

D	C	B	A

A, D, C, B

ROUND 3, QUESTION 4

Estimate the percentage of this pie chart shaded blue

81 to 83

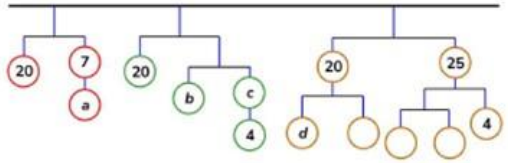
ROUND 3, QUESTION 5

Estimate the length of the blue route shown on the map, in km.

290 to 348

ROUND 3, QUESTION 6

Earlier in the challenge, you saw these 'mobiles'.



Estimate the number of minutes since they first appeared on the screen.

± 2 mins

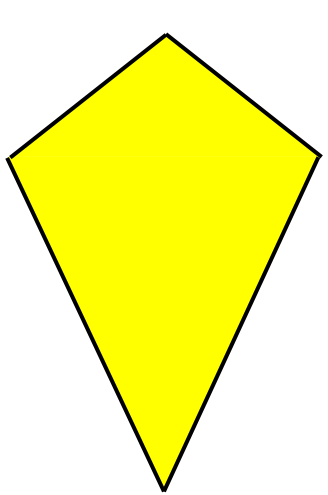
Round 4

General Mathematics Questions

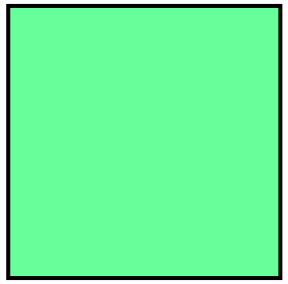
90 seconds for Questions 1 to 4

2 minutes for Questions 5 and 6

ROUND 4, QUESTION 1

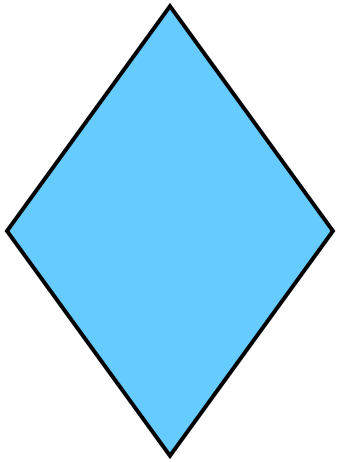


kite

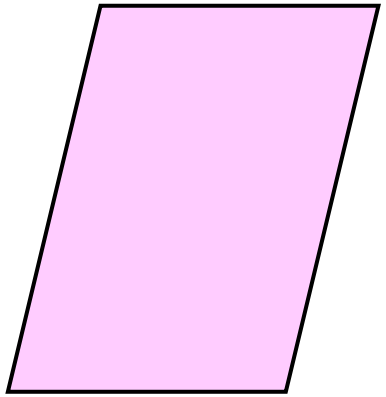


square

rectangle



rhombus



parallelogram

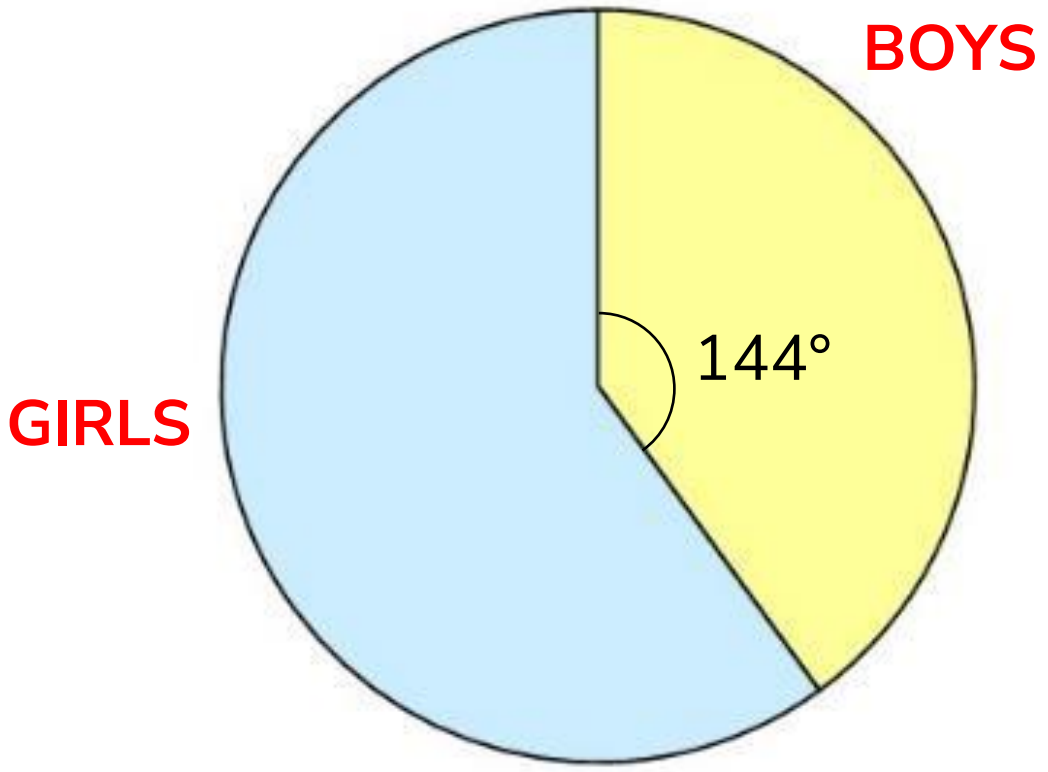
Add together the numbers of lines of symmetry in these quadrilaterals

ROUND 4, QUESTION 2

The pie chart represents the number of girls and boys in a Maths class.

There are 30 boys and girls in total.

The angle for boys in the pie chart is 144°.

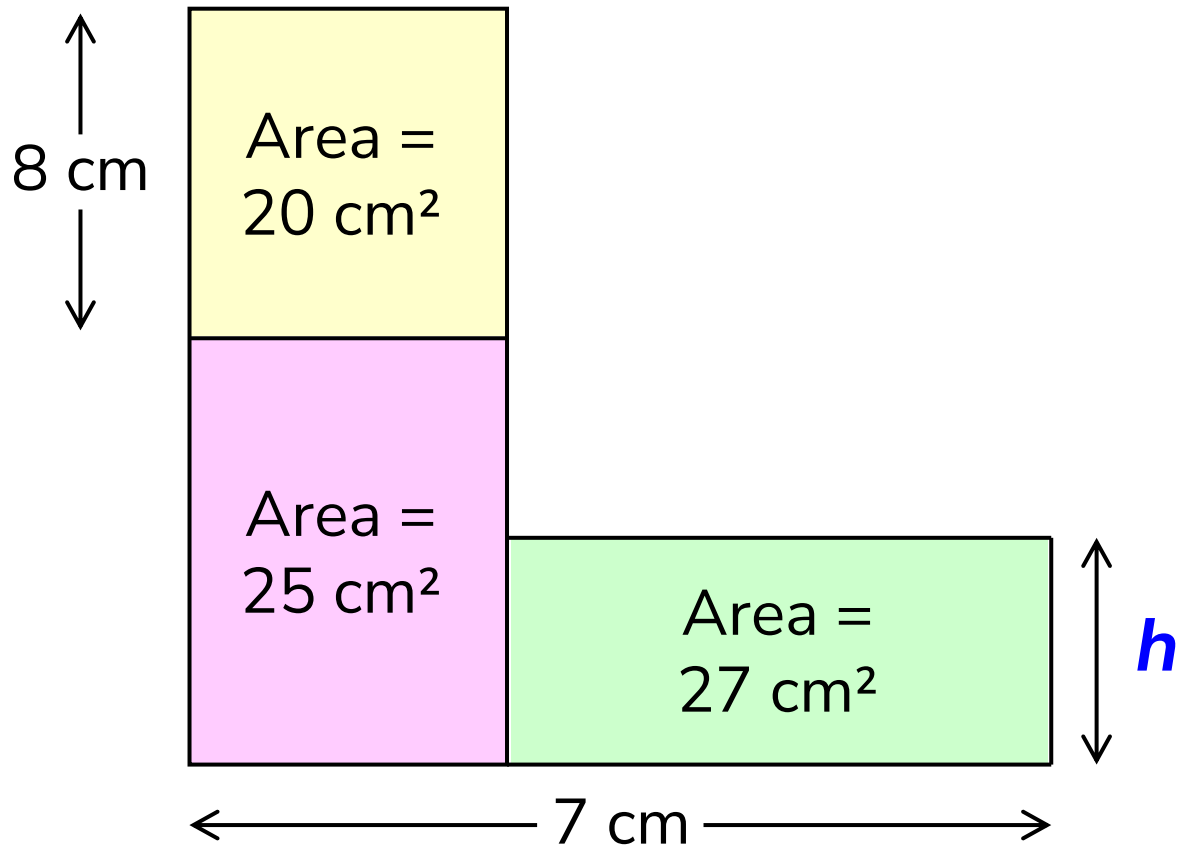


How many more girls are there than boys in the class?

ROUND 4, QUESTION 3

Three rectangles are joined together to form an L-shape.

The diagram is **not** drawn to scale.



Work out the length of the line marked *h*.

ROUND 4, QUESTION 4

Amy and Baljit share some money.

Amy has five times as much money as Baljit.

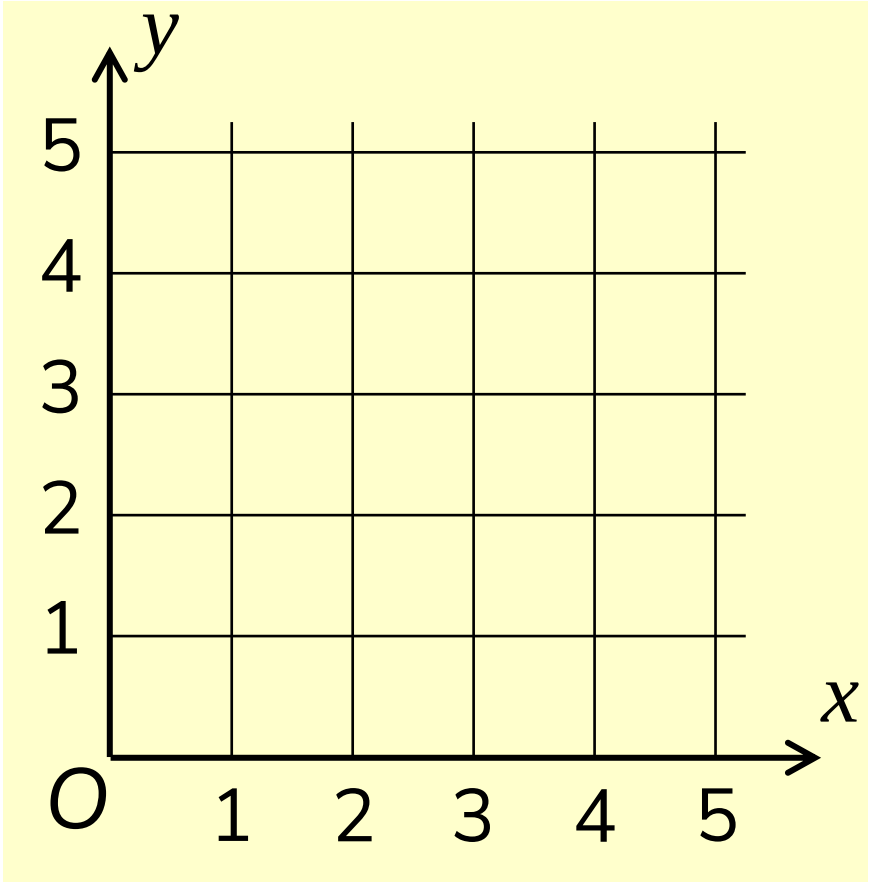
Baljit's share is £116 less than Amy's share.

How much money did they share in total?

ROUND 4, QUESTION 5

The sum of the co-ordinates is greater than 4 but less than 8.

The y-coordinate is greater than the x-coordinate, but less than double the x-coordinate.



Which point on the grid is being described?

On the *Google* sheet, enter one co-ordinate in each cell.

ROUND 4, QUESTION 6

I start with a two-digit number: **45**.

I multiply the number by both of its digits:

$$4 \times 5 \times 45 = 900$$

I start with a different two-digit number, and this time the result is **336**.

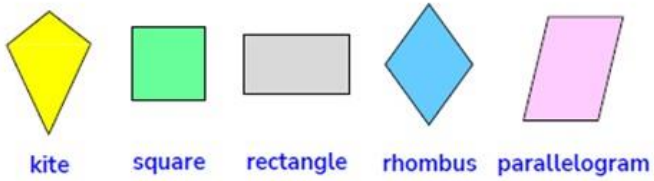
What was the two-digit number I started with?

End of Round 4

Please finalise your answers, and pass them to your teachers for entry onto the *Google* sheet.

ANSWERS TO ROUND 4

ROUND 4, QUESTION 1



Add together the numbers of lines of symmetry in these quadrilaterals

$1 + 4 + 2 + 2 + 0 = \mathbf{9}$

ROUND 4, QUESTION 2

The pie chart represents the number of girls and boys in a Maths class.

There are 30 boys and girls in total.

The angle for boys in the pie chart is 144°.

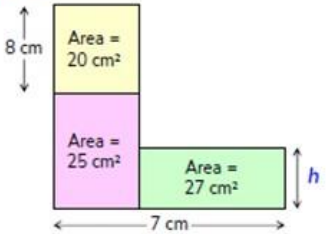
How many more girls are there than boys in the class?

6

ROUND 4, QUESTION 3

Three rectangles are joined together to form an L-shape.

The diagram is **not** drawn to scale.



Work out the length of the line marked *h*.

6 cm

ROUND 4, QUESTION 4

Amy and Baljit share some money.

Amy has five times as much money as Baljit.

Baljit's share is £116 less than Amy's share.

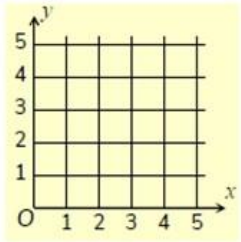
How much money did they share in total?

£174

ROUND 4, QUESTION 5

The sum of the co-ordinates is greater than 4 but less than 8.

The y-coordinate is greater than the x-coordinate, but less than double the x-coordinate.



Which point on the grid is being described?

On the *Google* sheet, enter one co-ordinate in each cell.

(2, 3)

ROUND 4, QUESTION 6

I start with a two-digit number: **45**.

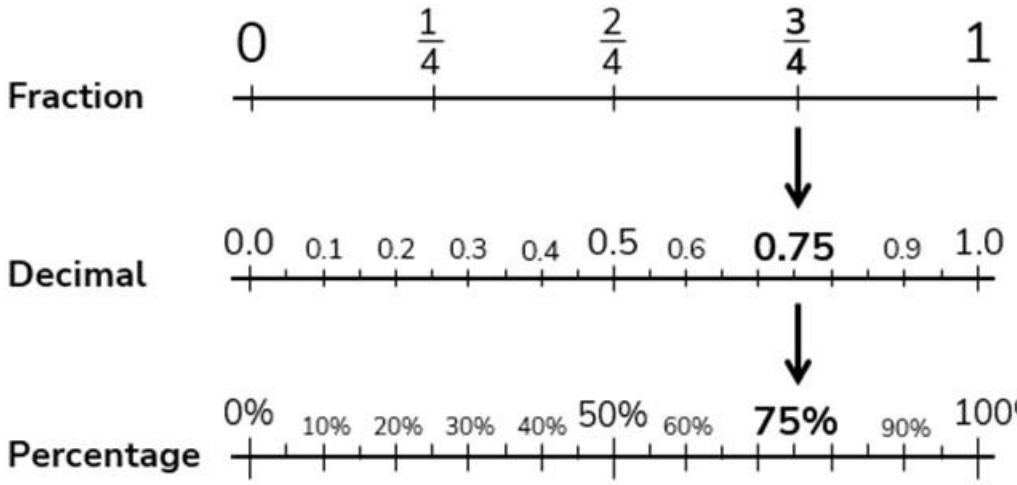
I multiply the number by both of its digits:

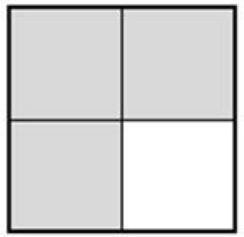
$$4 \times 5 \times 45 = 900$$

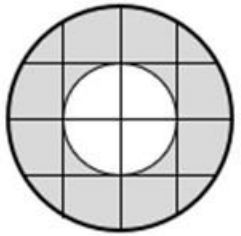
I start with a different two-digit number, and this time the result is **336**.

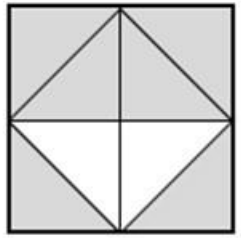
What was the two-digit number I started with?

42 $(4 \times 2 \times 42 = 336)$



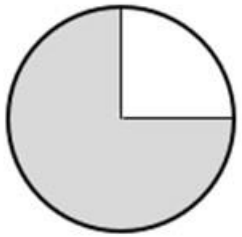


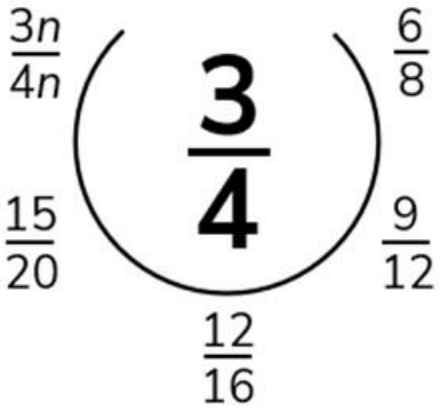


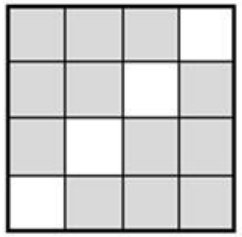


$\frac{3}{4}$ of an hour

= 45 minutes

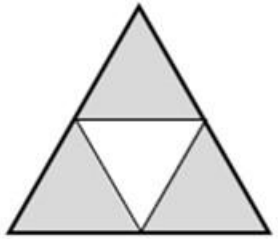






$\frac{3}{4}$ of a turn

= 270°



Sums of unit fractions

$$\frac{3}{4} = \frac{1}{2} + \frac{1}{4}$$

$$= \overbrace{\frac{1}{3} + \frac{1}{6}} + \frac{1}{4}$$

$$= \frac{1}{3} + \frac{1}{6} + \overbrace{\frac{1}{5} + \frac{1}{20}}$$

$$= \overbrace{\frac{1}{4} + \frac{1}{12}} + \frac{1}{6} + \frac{1}{5} + \frac{1}{20}$$

YEAR 7 MATHS CHALLENGE 2025, HEAT 1

Well done to all!

The results are …

Thank you for taking part.

YEAR 7 MATHEMATICS CHALLENGE

Heat 1, via *Livestorm*

Tuesday 25th February 2025

William Thallon, Secondary Mathematics Adviser

Madeline Hyles, Secondary Team