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- Please join using **Google Chrome, Firefox** or **Safari**
- If you are in Microsoft Edge and want to use a different browser, copy the address in the address bar, open the other browser and paste the address into the address bar there:



- If you lose connection, or have an issue with sound, or it feels like something has 'stuck', refresh your web browser's page (Ctrl-R, the F5 key, or click the appropriate 'refresh' or 'reload' button in your web browser).
- This session is being recorded



Housekeeping – taking part

- We **cannot** hear or see you!
- Please respond to polls these help us help you
- Please use the panels to the **right** Chat for general comments which aren't for presenters and Questions for those which are
- Please ask questions as early as you can
- If necessary, please indicate who a question is for for example:

Q for Caroline: (how) will completing this affect funding?

 If you want to say "Yes, that's my question too", click the up arrow next to it



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Non-split screen



Year 7 **Mathematics Challenge** Final Hertfordshire Development Centre Thursday 26th March 2020



@HfLSecMaths

William Thallon Secondary Mathematics Adviser



Year 7 **Mathematics Challenge** Final via Livestorm Thursday 15th October 2020



William Thallon Secondary Mathematics Adviser



Welcome













Welcome







Leventhorpe







Welcome





Richard Hale







Watford Grammar School for Girls



Watford Grammar School for Girls



The Four Rounds

- Round 1 General Maths questions
- Round 2 Memory Round
- Round 3 Problem and 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!
- Your teacher has been sent a spreadsheet to record your answers. This should be returned by e-mail at the end.



Round 1 General Mathematics Questions







HIGHTOWN

If this town sign is turned upside-down, how many of the eight letters will look the same?







On the reverse side of these cards there are five consecutive numbers.

The sum of the three largest numbers is **246**.

What is the sum of the three smallest numbers?



Question 3

Find four positive integers, each greater than 1, which could go in the boxes to make this statement true:



(Your integers do not all have to be different.)

Round 1

Question 4

This sketch diagram is not drawn accurately.

Triangle *ABC* is equilateral.



Work out the size of angle EAF.

Round 1

Question 5

A bucket full of water weighs exactly 21 kg.

Two-thirds of the water in the bucket is tipped out.



The bucket, with the water that is left, weighs 9.6 kg.

What is the mass of the empty bucket?





Here is the start of a sequence of numbers:

2,500 2,000 ...

Each term in the sequence is 80% of the term before.

What is the smallest number in the sequence that is an integer?

Round 1





End of Round 1

Round 2

Memory Round

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

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

The poster will be shown on the screen. The scribes 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

Scribes can draw at any time during the whole period.

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.)

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 scribes ... and to get into position!

Poster about to be displayed for the first time.

9: lives of a cat letters in the word 'September' symphonies of Beethoven

The digit sum of 13,095 is 18 18 is a multiple of 9 So 13,095 is a multiple of 9

The word 'noon' originally meant '9 hours after sunrise' $9^2 = 81$ 8 + 1 = 9 12,345,679 × 9 = 111,111,111 12,345,679 × 18 = 222,222,222 etc, down to ... 12,345,679 × 81 = 999,999,999



Recurring decimals $\frac{4}{9} = 0.\dot{7}$ $\frac{17}{99} = 0.\dot{1}\dot{7}$ $\frac{217}{999} = 0.\dot{2}1\dot{7}$

8 is a perfect cube 9 is a perfect square The only consecutive numbers that are perfect powers.

Fraction	Base 10	Base 9
<u>1</u> 2	0.5	0.4
$\frac{1}{3}$	0.3	0.3
$\frac{1}{4}$	0.25	0.2

Round 2

Memory Round

Second viewing of poster coming up!

9: lives of a cat letters in the word 'September' symphonies of Beethoven

The digit sum of 13,095 is 18 18 is a multiple of 9 So 13,095 is a multiple of 9

The word 'noon' originally meant '9 hours after sunrise' $9^2 = 81$ 8 + 1 = 9 12,345,679 × 9 = 111,111,111 12,345,679 × 18 = 222,222,222 etc, down to ... 12,345,679 × 81 = 999,999,999



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$\frac{1}{4}$	0.25	0.2
Memory Round

Memory Round

Third viewing of poster coming up!

9: lives of a cat letters in the word 'September' symphonies of Beethoven

The digit sum of 13,095 is 18 18 is a multiple of 9 So 13,095 is a multiple of 9

The word 'noon' originally meant '9 hours after sunrise' $9^2 = 81$ 8 + 1 = 9 12,345,679 × 9 = 111,111,111 12,345,679 × 18 = 222,222,222 etc, down to ... 12,345,679 × 81 = 999,999,999



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$\frac{1}{3}$	0.3	0.3	
$\frac{1}{4}$	0.25	0.2	

Memory Round

Memory Round

Fourth and final viewing of poster coming up!

9: lives of a cat letters in the word 'September' symphonies of Beethoven

The digit sum of 13,095 is 18 18 is a multiple of 9 So 13,095 is a multiple of 9

The word 'noon' originally meant '9 hours after sunrise' $9^2 = 81$ 8 + 1 = 9 12,345,679 × 9 = 111,111,111 12,345,679 × 18 = 222,222,222 etc, down to ... 12,345,679 × 81 = 999,999,999



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<u>1</u> 2	0.5	0.4	
$\frac{1}{3}$	0.3	0.3	
$\frac{1}{4}$	0.25	0.2	

Memory Round

Memory Round Time's up!

Everyone should now come back into the main room.

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

david.cook@hertsforlearning.co.uk

End of Round 2

Round 3 **Problem and** Estimation Round

There are six questions in this round.

The first four are problems/puzzles. 10 marks for each correct answer.

For the other two, you have to estimate a quantity.

The closer your estimate, the more marks you will score. You will score 10 marks if you get it exactly (or very nearly) right.

The problems have been printed for you.

There is an extra sheet to help you work out Question 1.

You have **15 minutes** to get as many of the answers as you can.

We will give a reminder when there are 2 minutes left.

GOOD LUCK!



5 9 19







Less than two minutes to go.

End of Round 3

Round 4 General Mathematics Questions



Question 1

There are 150 students in Year 8.

- 19 of them go to Chess Club.
- Of these, 7 students also go to Computer Club.
- 111 students in Year 8 do not go to either Chess Club or Computer Club.

How many Year 8 students go to Computer Club?





Exactly **two** of the last ten years have been prime numbers.

Which ones?

Question 3

Jaden has invented a new operation. He calls it 'star'.

For any two numbers, 'starring' them means you add their product and their sum.

- For example: 4 * 7 = 28 + 11= 39
 - What is the value of *a* if $a \neq 5 = 32$?

Question 4

Three congruent rectangles are joined together to make a different rectangle.





What is the total area?





Find positive integers *a* and *b* which satisfy the equation below:

$5a^2 + 1 = b^2$



Question 6

Rohan has 210 cubes. Each cube has a side length of 1 cm.

Rohan makes a cuboid using **all** of his cubes.

The base of the cuboid has perimeter 18 cm.

What is the height of the cuboid?

Round 4	Question 1	Round 4	Question 2	Round 4	Question 3
There are 150 students in	Year 8.	Exactly two of the last ten years have been prime numbers. Which ones?		Jaden has inve	nted a new operation.
19 of them go to Chess C	ub.				
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How many Year 8 students go to Computer Club?				What is the value of <i>a</i> if <i>a</i> * 5 = 32 ?	

Round 4 Qu	estion 4	Round 4	Question 5	Round 4	Question 6	
Three congruent rectangles are joined together to make a different rectangle.		Find positive integers a and b		Rohan has 210 cubes.		
		which satisfy the below:	equation	Each cube has a side	length of 1 cm.	
				Rohan makes a cuboi his cubes.	d using all of	
		5 <i>a</i> ² + 1	$= b^2$	The base of the cuboi 18 cm.	d has perimeter	
\leftarrow 24 cm \longrightarrow What is the total area?	?			What is the he cuboic	ight of the d?	

End of Round 4

Year 7 Mathematics Challenge Final 2020

Please finalise your answer spreadsheet as quickly as possible.

Please include the school/team name in the file name, and e-mail it to:

william.thallon@hertsforlearning.co.uk

Year 7 Mathematics Challenge Final 2020

Marking in progress

Round 1 Answers



Round 2 Answer

9: lives of a cat letters in the word 'September' symphonies of Beethoven

The digit sum of 13,095 is 18 18 is a multiple of 9 So 13,095 is a multiple of 9

The word 'noon' originally meant '9 hours after sunrise'

9² = 81

8 + 1 = 9

 $12,345,679 \times 9 = 111,111,111$ $12,345,679 \times 18 = 222,222,222$ etc, down to ... $12,345,679 \times 81 = 999,999,999$



Recurring decimals $\frac{4}{9} = 0.\dot{7}$ $\frac{17}{99} = 0.\dot{1}\dot{7}$ $\frac{217}{999} = 0.\dot{2}\dot{1}\dot{7}$ The second second

8 is a perfect cube 9 is a perfect square The only consecutive

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<u>1</u> 2	0.5	0.4	
$\frac{1}{3}$	0.3	0.3	
<u>1</u> 4	0.25	0.2	

Round 3 Answers



Round 4 Answers

Round 4	Question 1	Round 4	Question 2	Round 4	Question 3
There are 150 studer 19 of them go to Che Of these, 7 students Computer Club. 111 students in Year either Chess Club or How many Year 8 Computer	nts in Year 8. ess Club. are also go to 8 do not go to Computer Club. students go to Club?	Exactly two of have been prin Whic	f the last ten years ne numbers. ch ones?	Jaden has inver He calls it `star' For any two nur means you add their sum. For example: What is the a >	nted a new operation. mbers, `starring' them their product and 4 * 7 = 28 + 11 = 39 he value of <i>a</i> if * 5 = 32 ?
27	7	2011	, 2017	4	4.5
Round 4	Question 4	Round 4	Question 5	Round 4	Question 6
Three congruent rectangles are joined together to make a different rectangle.		Find positive integers a and b which satisfy the equation below:Rohan has 210 cubes. Each cube has a side length of Rohan makes a cuboid using a his cubes. $5a^2 + 1 = b^2$ The base of the cuboid has per 18 cm.What is the height of cuboid?		cubes. a side length of 1 cm. cuboid using all of cuboid has perimeter he height of the uboid?	
384	cm ²	a = 4	b = 9	15	5 cm

Year 7 Mathematics Challenge Final 2020

Results imminent!
Well done to all



Year 7 **Mathematics Challenge** Final Hertfordshire Development Centre Wednesday 24th April 2019



William Thallon Secondary Mathematics Adviser





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