YEAR 8 MATHEMATICS CHALLENGE

Final, Oak Room (Hertfordshire Development Centre)

Thursday 11th June 2026

Mel Chrisp

Secondary Mathematics Adviser

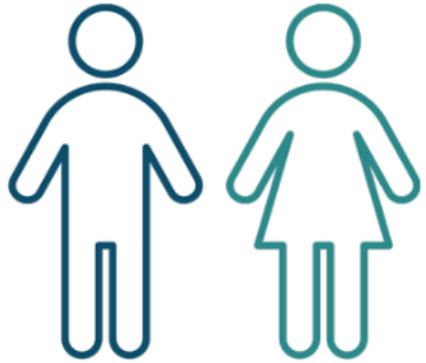
HFL Education

FORMERLY HERTS FOR LEARNING

HOUSEKEEPING

- Fire alarm and exits

- Toilets



- Use of mobile phones

- Refreshments

HFL Education
FORMERLY HERTS FOR LEARNING

FORMAT OF CHALLENGE

Round 1	General Maths questions
Round 2	Memory Round
Round 3	Estimation and Problem-Solving Round
Round 4	General Maths questions

60 marks for each round

FIRST OF ALL ...

Almost 80 teams took part in this years heats.
The top-scoring 17 teams have been invited to the final today.

The mean score for all teams in the heats was 149.
The mean score for the 17 teams selected for the Final was 185. So, whatever happens:

CONGRATULATIONS!

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!
- Please use the same team name as in the heats. I will remind you of them shortly. Include the team name on all the Answer Sheets you hand in.

PRELIMINARIES

- Don’t leave any answers blank. ‘Near misses’ or partially correct answers may score points.
- Where necessary, make sure you include the correct **units**. If you forget to do this, you will not gain full marks for the question, even if the numerical answer is correct.

Round 1

General Mathematics Questions

90 seconds for each question

ROUND 1, QUESTION 1

A, B, C, D and E are different digits. Given this, work out what values of A, B, C, D and E would satisfy the following calculation:

$$ABCD \times E = DCBA$$

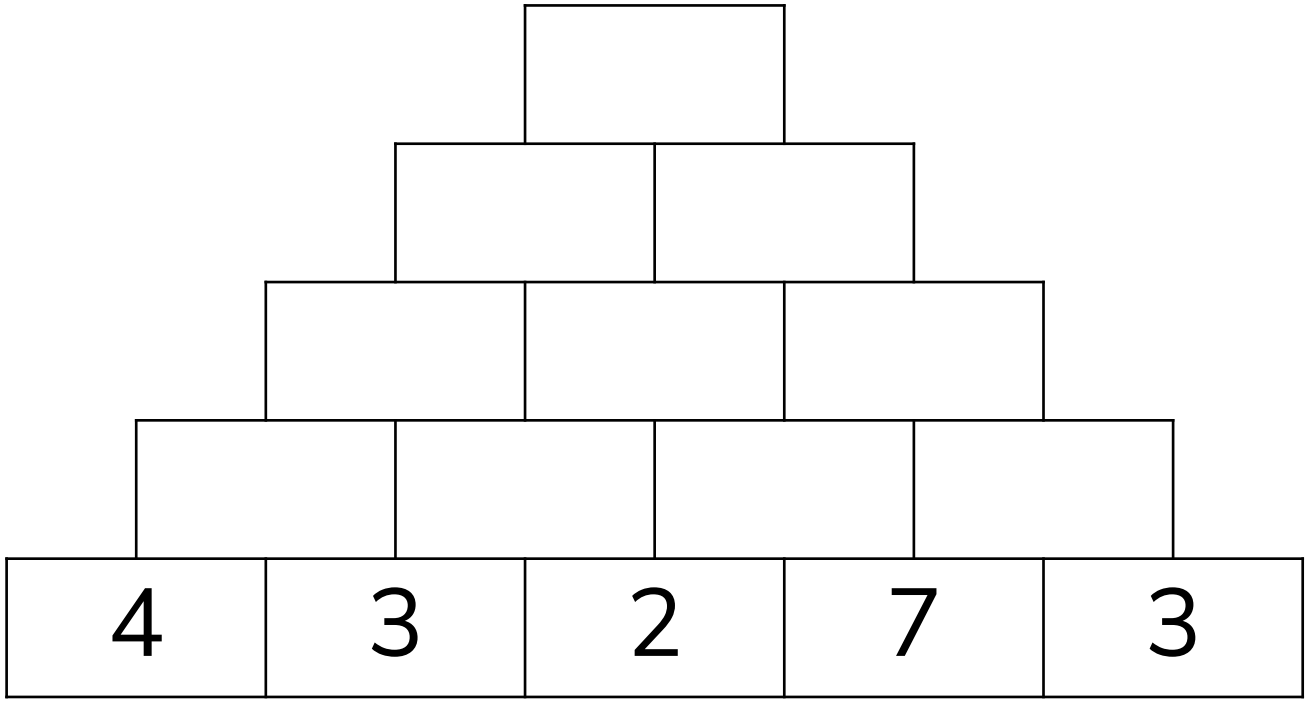
ROUND 1, QUESTION 2

Three of the coordinates of a square are
(20, 10) (30, 20) (20, 30) .

The square is reflected in the x-axis.

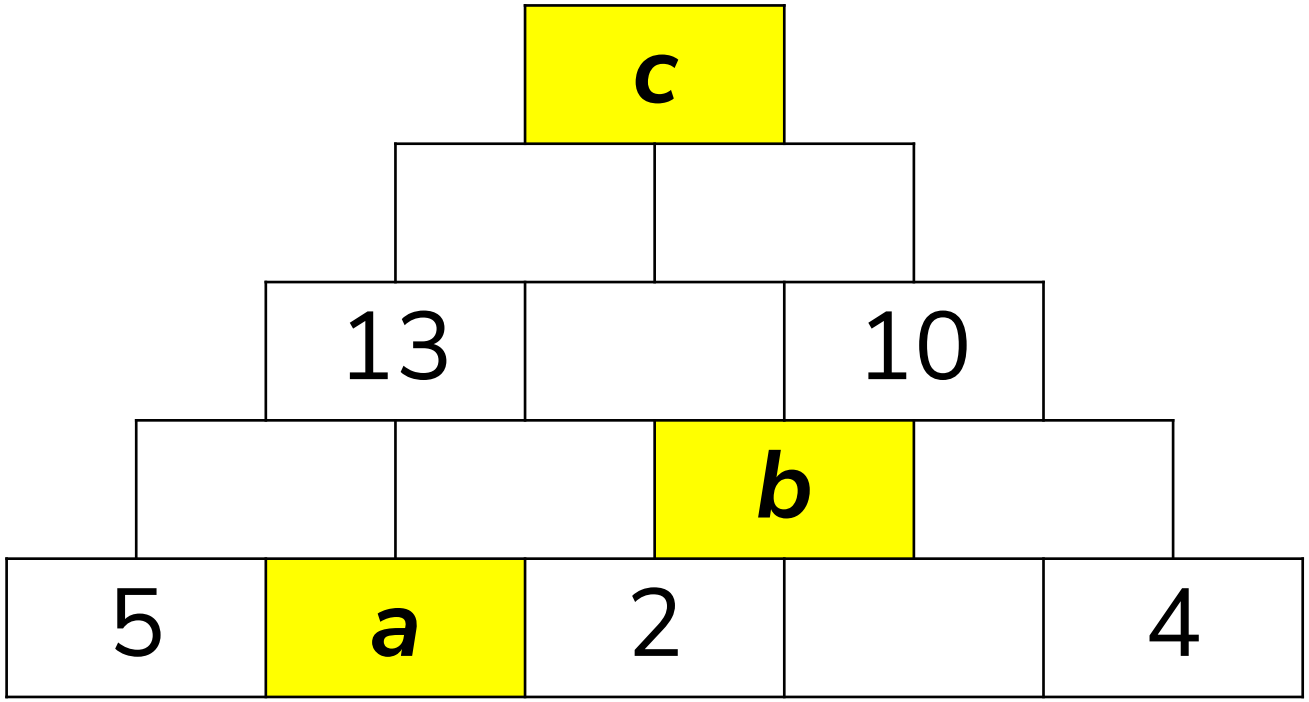
What are the coordinates of the centre of the reflected square?

ROUND 1, QUESTION 3



In this number wall, each number above the bottom row is the sum of the two numbers below it.

ROUND 1, QUESTION 3



This number wall obeys the same rule.

Four numbers in the wall are shown.

What numbers go in the cells *a*, *b* and *c*?

ROUND 1, QUESTION 4

A sequence consists of positive and negative integers in this pattern:
1, –2, –2, 3, 3, 3, –4, –4, –4, –4,
and so on, ending with
–8, –8, –8, –8, –8, –8, –8, –8.

What is the median?

ROUND 1, QUESTION 5

A regular pentagon-based pyramid has 5 faces which are equilateral triangles.

The perimeter of its net is 70cm.

What is the perimeter of the base of the pyramid?

ROUND 1, QUESTION 6

On Bella's holiday, 11 days had some rain.

A morning rain was always followed by a clear afternoon.

An afternoon rain was always preceded by a clear morning.

A total of 9 mornings and 12 afternoons were clear.

How many days had no rain at all?

End of Round 1

ANSWERS TO ROUND 1

ROUND 1, QUESTION 1

A, B, C, D and E are different digits. Given this, work out what values of A, B, C, D and E would satisfy the following calculation:

ABCD x E = DCBA

A=2 B=1 C=7 D=8 E=4
(2 marks each)

ROUND 1, QUESTION 2

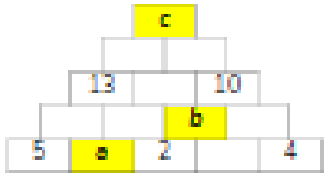
Three of the coordinates of a square are
(20, 10) (30, 20) (20, 30) .

The square is reflected in the x-axis.

What are the coordinates of the centre of the reflected square?

(20, -20)
(5 marks each)

ROUND 1, QUESTION 3



This number wall obeys the same rule.

Four numbers in the wall are shown.

What numbers go in the cells *a*, *b* and *c*?

a=3, b=4 (3 marks each)
c=41(4 marks)

ROUND 1, QUESTION 4

A sequence consists of positive and negative integers in this pattern:
1, −2, −2, 3, 3, 3, −4, −4, −4, −4,
and so on, ending with
−8, −8, −8, −8, −8, −8, −8, −8.

What is the median?

-3

ROUND 1, QUESTION 5

A regular pentagon-based pyramid has 5 faces which are equilateral triangles.

The perimeter of its net is 70cm.

What is the perimeter of the base of the pyramid?

35cm
6 marks (+4 units)

ROUND 1, QUESTION 6

On Bella's holiday, 11 days had some rain.

A morning rain was always followed by a clear afternoon.

An afternoon rain was always preceded by a clear morning.

A total of 9 mornings and 12 afternoons were clear.

How many days had no rain at all?

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 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.

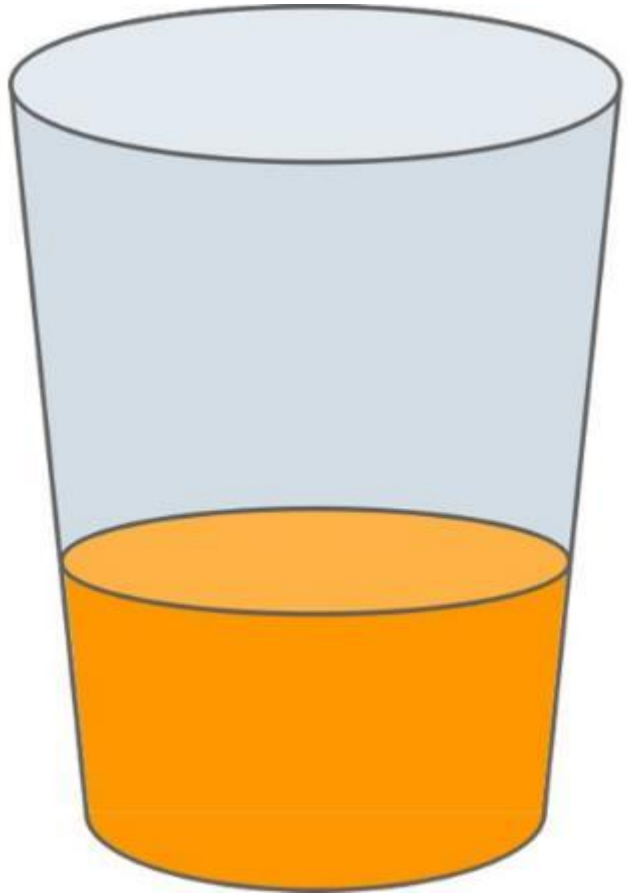
Note to the artists

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

Round 2

Memory Round

End of Round 2



Egyptian Fractions

The Ancient Egyptians used only Distinct Unit Fractions (fractions with a **numerator of 1**, and **different denominators**) to represent ALL fractions, using sums.

e.g. $\frac{5}{8}=\frac{1}{2}+\frac{1}{8}$, but not $\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}$ as the denominators are the same.

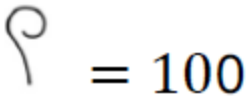
There are 5 ways of writing $\frac{5}{8}$ using **three distinct unit** fractions:

- $\frac{1}{3}+\frac{1}{4}+\frac{1}{24}$
- $\frac{1}{3}+\frac{1}{6}+\frac{1}{8}$
- $\frac{1}{2}+\frac{1}{9}+\frac{1}{72}$
- $\frac{1}{2}+\frac{1}{10}+\frac{1}{40}$
- $\frac{1}{2}+\frac{1}{12}+\frac{1}{24}$

$\frac{1}{2}$	
$\frac{1}{3}$	
$\frac{1}{4}$	
$\frac{1}{10}$	
$\frac{1}{18}$	

Egyptians used symbols rather than digits.

e.g. ∩ = 10

 = 100

This is called the Eye of Horus:

Powers of two were considered sacred.

Round 3

Estimation and Problem-Solving

ROUND 3, QUESTION 1

In July 2009, Usain Bolt set the world record for 100m sprint, competing the run in 9.58secs at the World Athletics Championships in Berlin.

If he could continue to run at this rate, given that 5miles is approximately 8km, how fast could he run a mile (in seconds)?

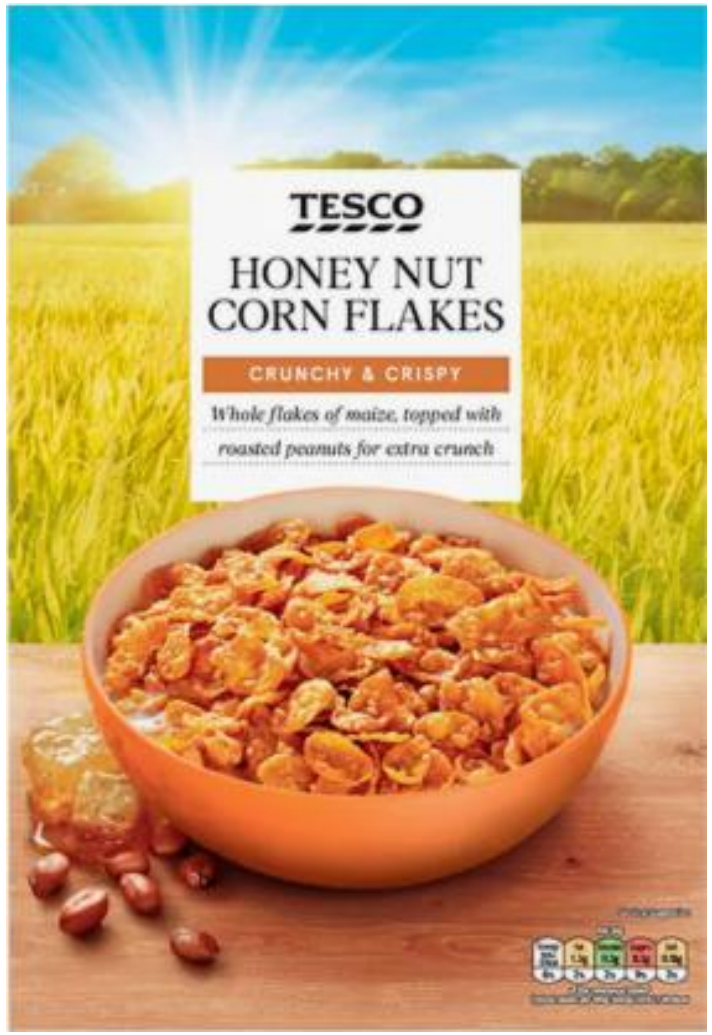
ROUND 3, QUESTION 2

I am going to use a stopwatch to count a period of time.

I will call out ‘start’ and ‘stop’.

Estimate the number of seconds between these words.

ROUND 3, QUESTION 3

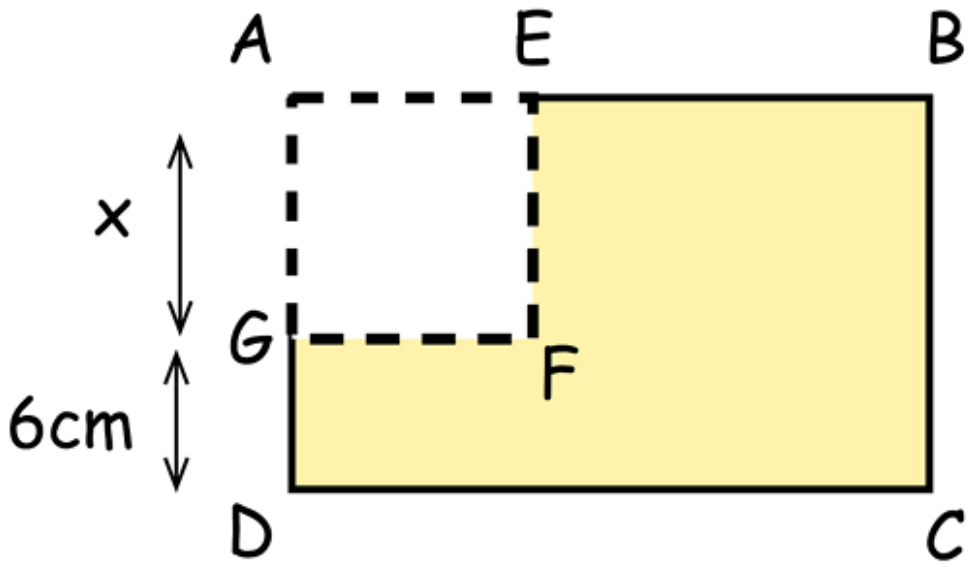


On your tables is a 500g box of Honey Nut Cornflakes.

Estimate the number of individual cornflakes in one box.

ROUND 3, QUESTION 4

ABCD is a rectangle.
The length of the rectangle, AB, is 40% longer than the width of the rectangle, AD.
A square AEFG is then removed from rectangle ABCD to leave a hexagon.



Given that x:6=3:2, find the **area** of the yellow hexagon.

ROUND 3, QUESTION 5

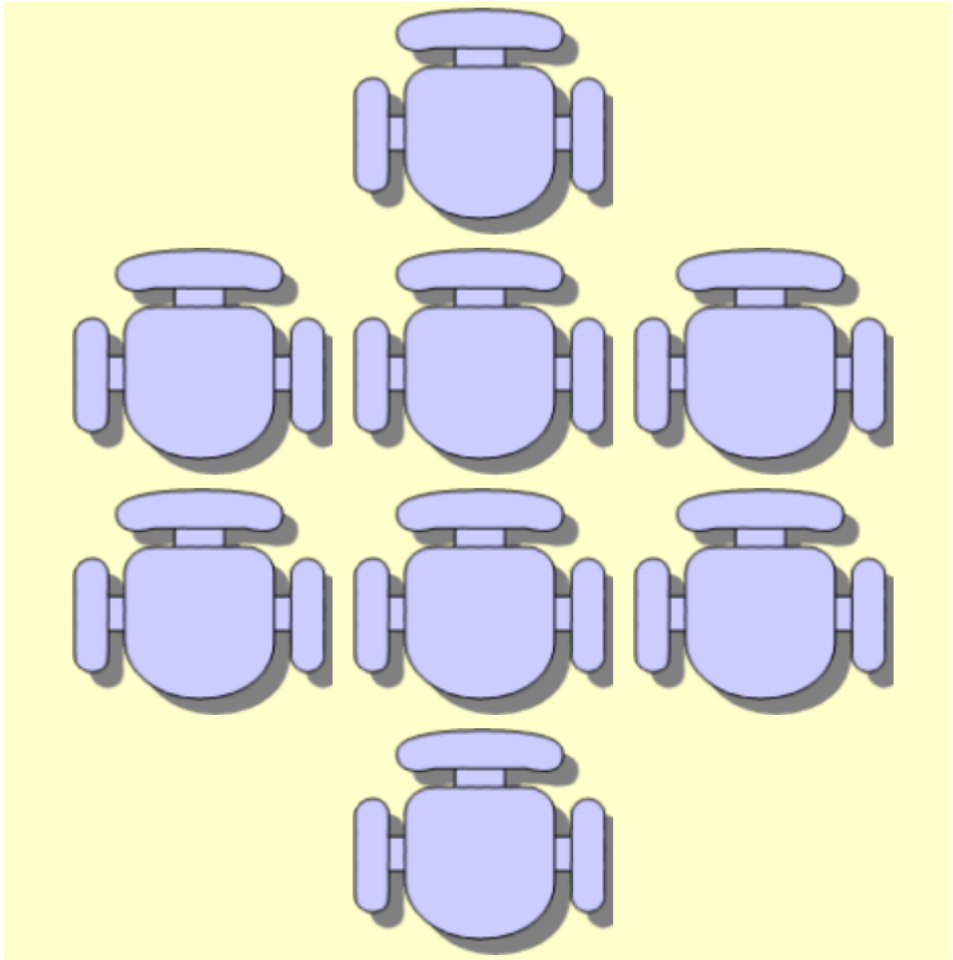
As Sarah is riding her bicycle on a long straight road, she spots Simon skooting in the same direction ½ mile in front of her.
After she passes him, she can see him in her rear mirror until he is 1/2 mile behind her.

Sarah rides at a constant rate of 12 miles per hour, and Simon skoots at a constant rate of 8 miles per hour.

For how many minutes can Sarah see Simon?

ROUND 3, QUESTION 6

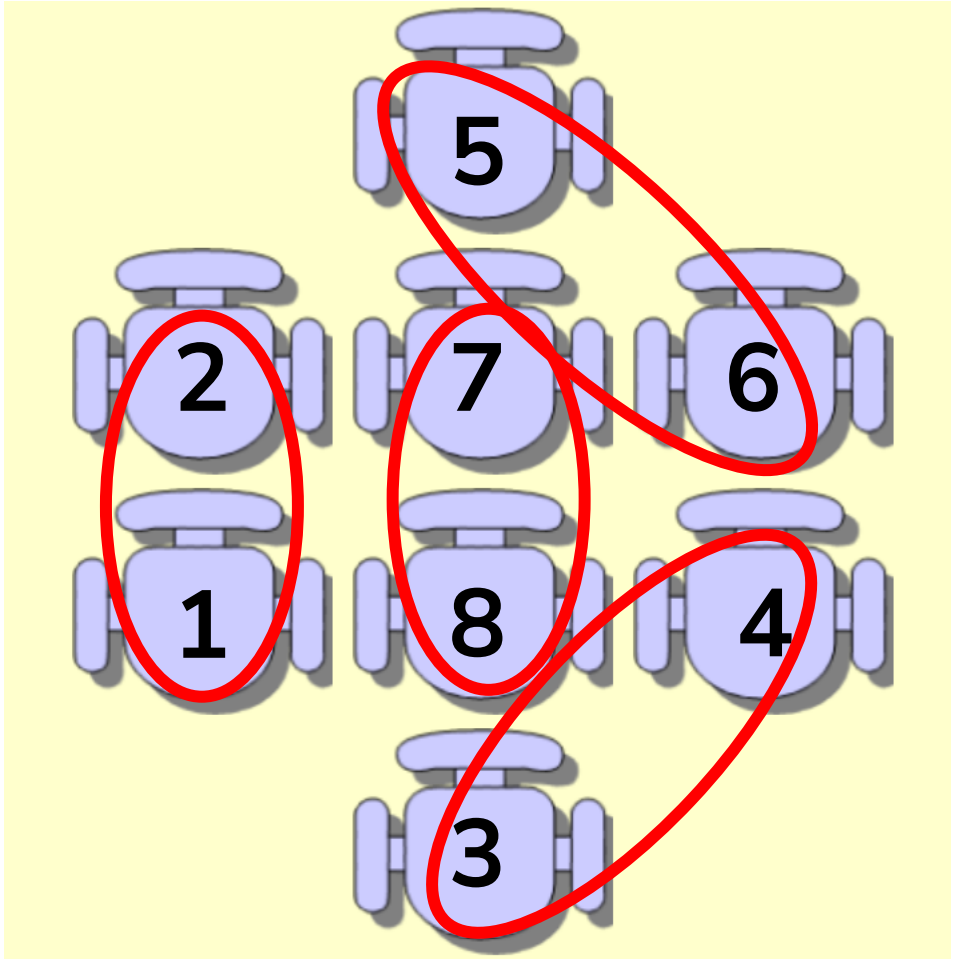
Can you arrange the students numbered 1-8 onto these chairs, so that **no two consecutively** numbered students sit next to each other either vertically, horizontally or diagonally?



ROUND 3, QUESTION 6

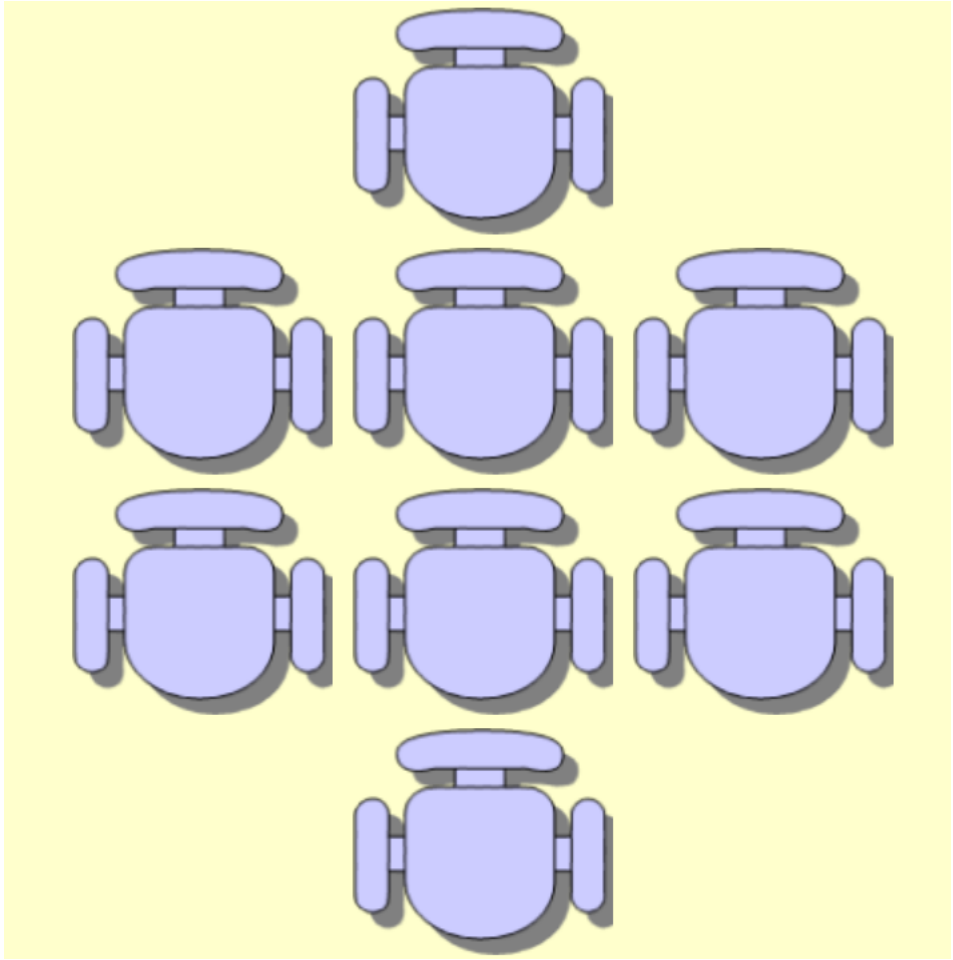
Can you arrange the students numbered 1-8 onto these chairs, so that **no two consecutively** numbered students sit next to each other either vertically, horizontally or diagonally?

For example, this formation would NOT be ok...



ROUND 3, QUESTION 6

Can you arrange the students numbered 1-8 onto these chairs, so that **no two consecutively** numbered students sit next to each other either vertically, horizontally or diagonally?



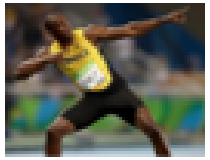
(There is a copy of the chair formation on your answer sheet to fill in)

End of Round 3

ANSWERS TO ROUND 3

ROUND 3, QUESTION 1

In July 2009, Usain Bolt set the world record for 100m sprint, competing the run in 9.58secs at the World Athletics Championships in Berlin.



If he could continue to run at this rate, given that 5miles is approximately 8km, how fast could he run a mile (in seconds)?

160 ± 10

ROUND 3, QUESTION 2

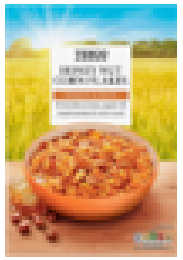
I am going to use a stopwatch to count a period of time.

I will call out 'start' and 'stop'.

Estimate the number of seconds between these words.

? ± 5secs

ROUND 3, QUESTION 3



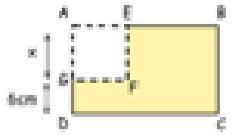
On your tables is a 500g box of Honey Nut Cornflakes.

Estimate the number of individual cornflakes in one box.

6000 ± 100

ROUND 3, QUESTION 4

ABCD is a rectangle.
The length of the rectangle, AB, is 40% longer than the width of the rectangle, AD.
A square AEFG is then removed from rectangle ABCD to leave a hexagon.



Given that x:60=3:2, find the **area** of the yellow hexagon.

234 cm²
6 marks (+4 units)

ROUND 3, QUESTION 5

As Sarah is riding her bicycle on a long straight road, she spots Simon skooting in the same direction ½ mile in front of her.
After she passes him, she can see him in her rear mirror until he is 1/2 mile behind her.

Sarah rides at a constant rate of 12 miles per hour, and Simon skoots at a constant rate of 8 miles per hour.

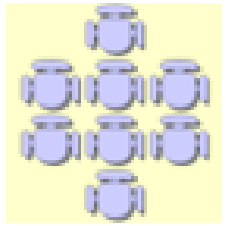
For how many minutes can Emily see Emerson?

15mins

ROUND 3, QUESTION 6

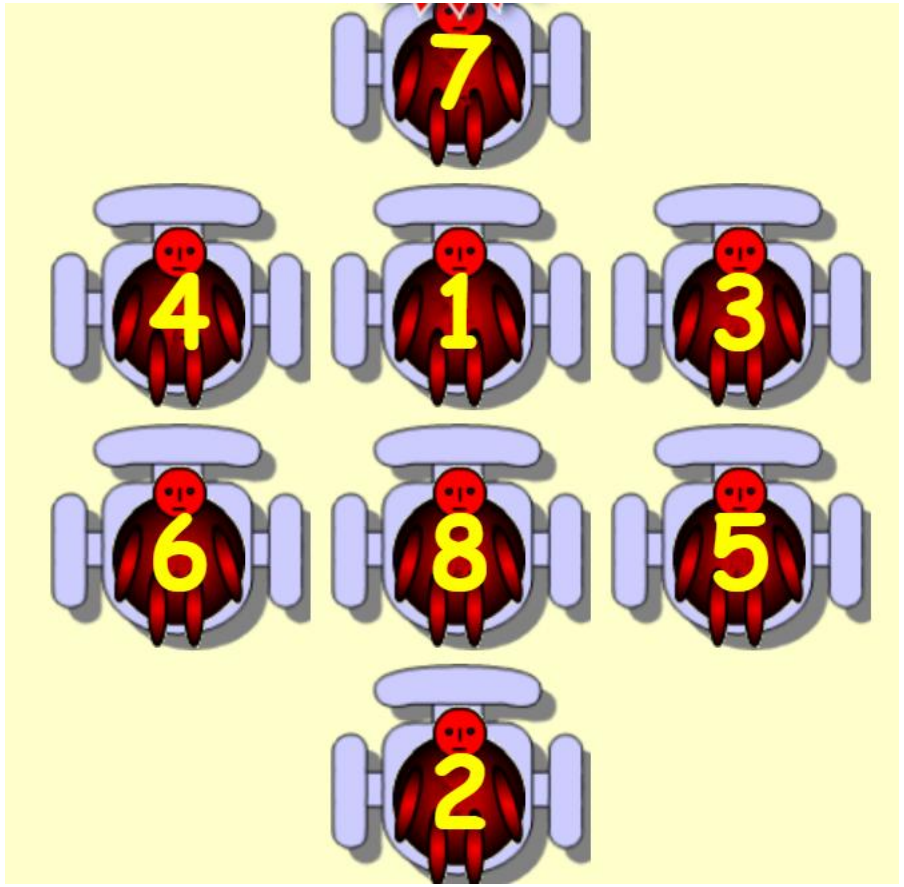
Can you arrange the students numbered 1-8 onto these chairs, so that **no two consecutively** numbered students sit next to each other either vertically, horizontally or diagonally.

(You have a copy of the chair formation on your answer sheet to fill in).

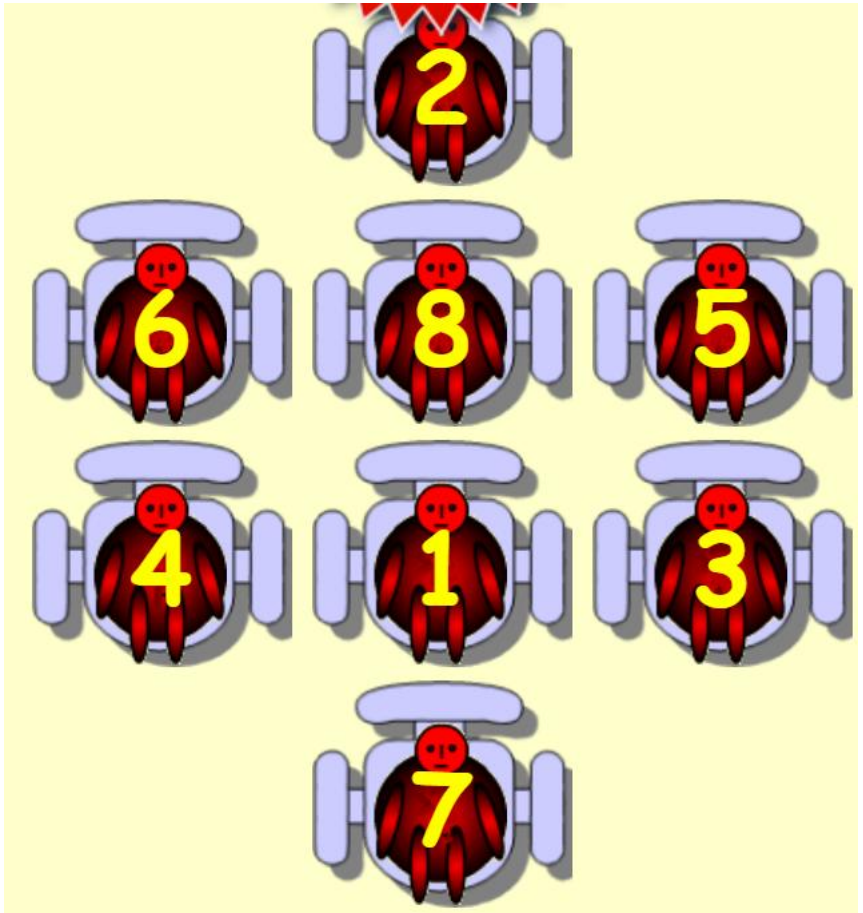


Answer on next slide

ROUND 3, QUESTION 6 SOLUTIONS



or



Round 4

General Mathematics Questions

90 seconds for Questions 1 to 4

2 minutes for Questions 5 and 6

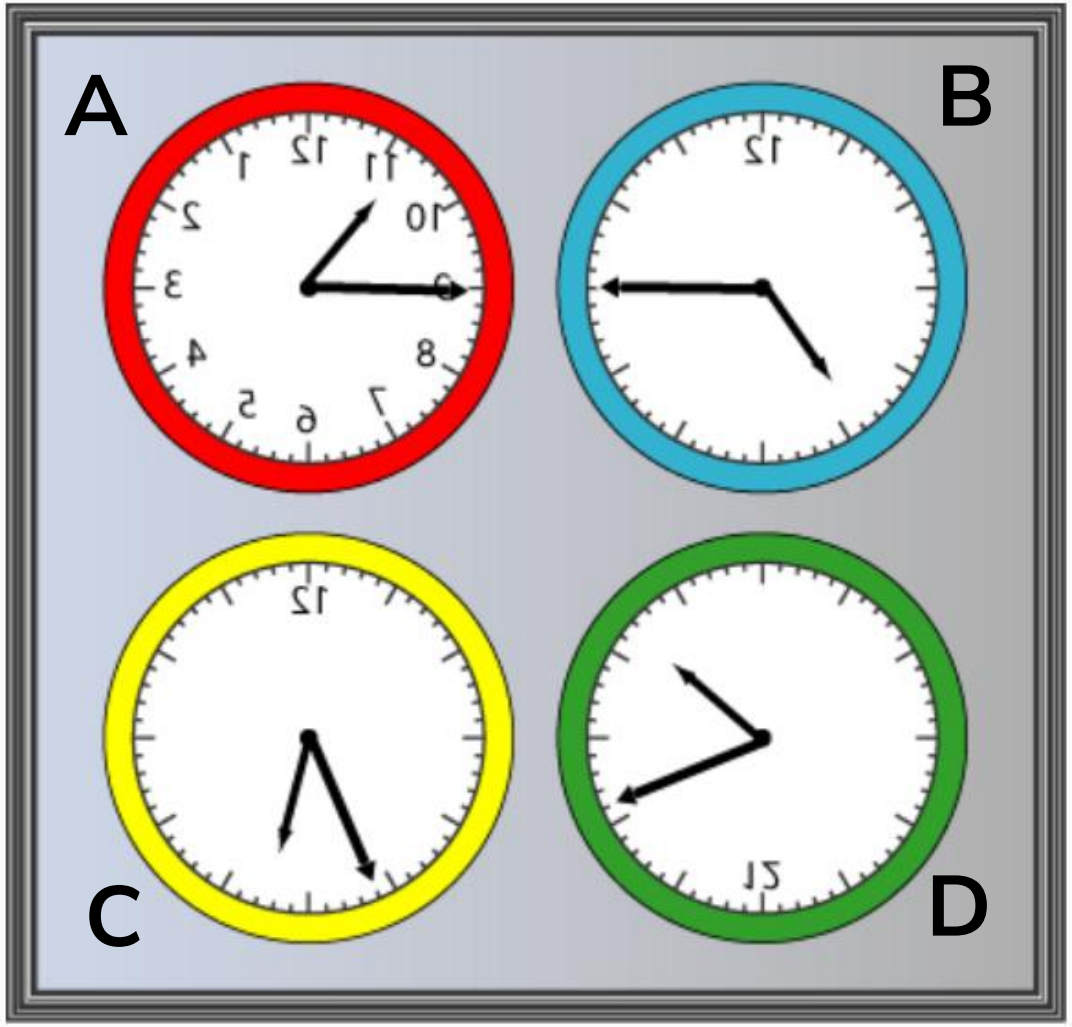
ROUND 4, QUESTION 1

How many days does a frog take to escape a 30-foot hole if it climbs 3 feet by day but slides back 2 feet by night?

ROUND 4, QUESTION 2

These clocks have been reflected in some funfair mirrors. The times are all in the morning (am).

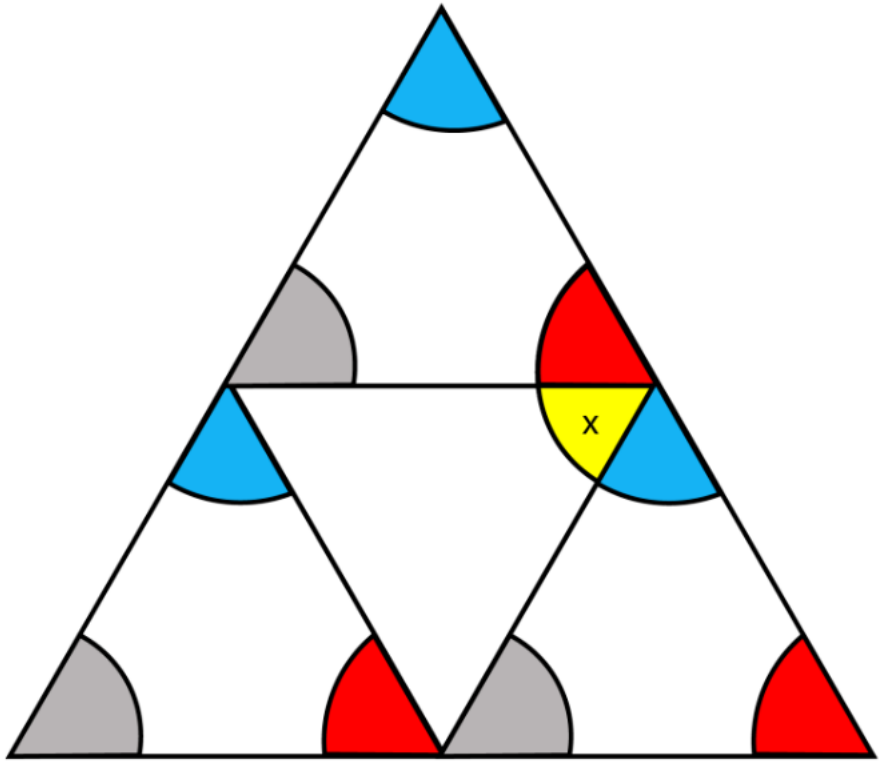
Put the clock letters in order of earliest to latest times.



ROUND 4, QUESTION 3

In this diagram, which option would give the same as angle x?

(Write down one letter)



A: 2 x Red **B: Grey** **C: Grey - Red** **D: Red + Blue**

ROUND 4, QUESTION 4

I am thinking of three distinct prime numbers that sum to make 35.

How many different sets of three prime numbers could I be thinking of?

ROUND 4, QUESTION 5

Amanda is making cheese sandwiches for an event. She has 6 loaves of bread, 3 blocks of cheese and 2 tubs of butter.

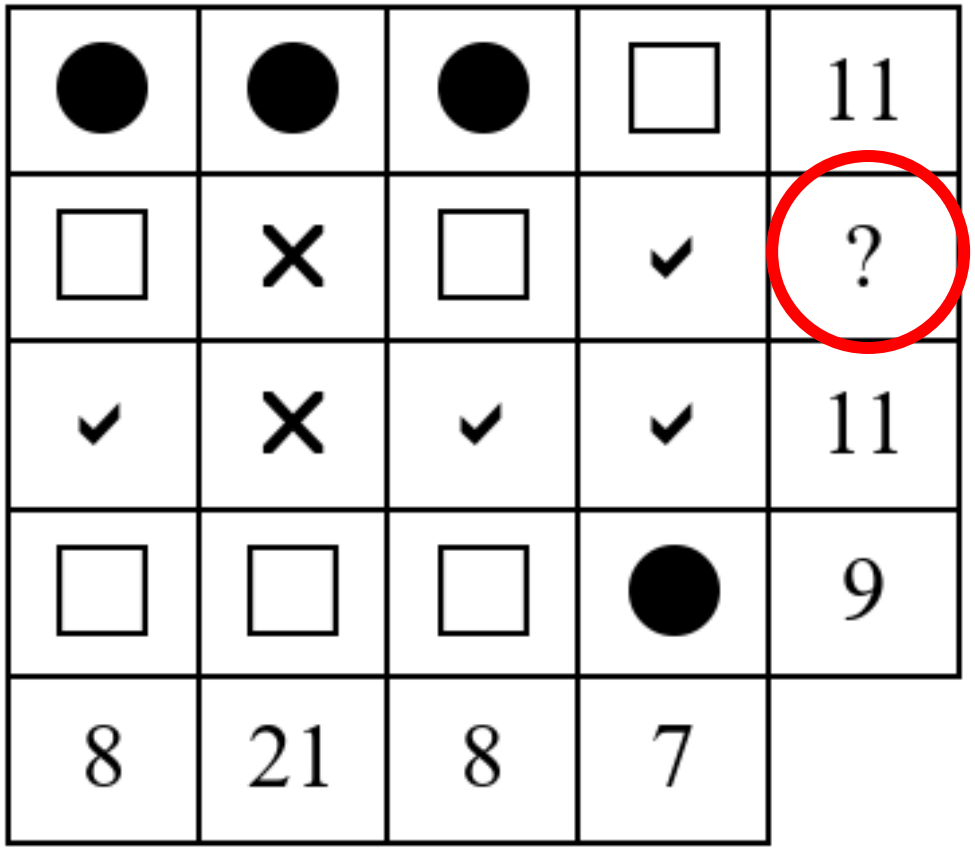
Each loaf of bread has 18 slices.
Each block of cheese weighs 350 grams.
Each tub of butter contains 370 grams.

To make a cheese sandwich, Amanda needs:
2 slices of bread 20 grams of cheese 15 grams of butter.

How many cheese sandwiches can Amanda make with the ingredients she has?

ROUND 4, QUESTION 6

In the diagram each symbol represents a number. The values at the end of each row and column are the totals.



Work out the missing total.

End of Round 4

ANSWERS TO ROUND 4

ROUND 4, QUESTION 1

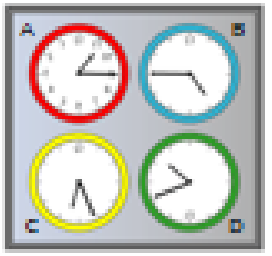
How many days does a frog take to escape a 30-foot hole if it climbs 3 feet by day but slides back 2 feet by night?

28

ROUND 4, QUESTION 2

These clocks have been reflected in a mirror. The times are all in the morning (am).

Put the clock letters in order of earliest to latest.

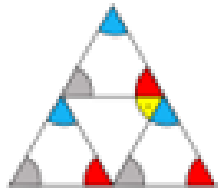


C = 5.35, **B** = 7.15, **D** = 7.49, **A**=10.45

ROUND 4, QUESTION 3

In this diagram, which option would give the same as angle x?

(Write down one letter)



A: 2 x **Red** **B:** **Grey** **C:** **Grey - Red** **D:** **Red + Blue**

B

ROUND 4, QUESTION 4

I am thinking of three prime numbers that sum to make 35.

How many different sets of three prime numbers could I be thinking of?

5 (3,13,19; 5,11,19; 7,11,17; 5,7,23; 5,13,17)

ROUND 4, QUESTION 5

Amanda is making cheese sandwiches for an event. She has 6 loaves of bread, 3 blocks of cheese and 2 tubs of butter.

Each loaf of bread has 18 slices.
Each block of cheese weighs 350 grams.
Each tub of butter contains 370 grams.

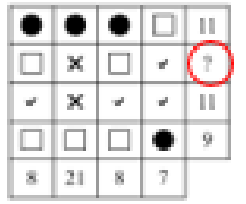
To make a cheese sandwich, Amanda needs:
2 slices of bread 20 grams of cheese 15 grams of butter.

How many cheese sandwiches can Amanda make with the ingredients she has?

49

ROUND 4, QUESTION 6

In the diagram each symbol represents a number. The values at the end of each row and column are the totals.



Work out the missing total.

13

YEAR 8 MATHS CHALLENGE 2026, FINAL

Marking in progress

YEAR 8 MATHS CHALLENGE 2026, FINAL

Results imminent!

YEAR 8 MATHS CHALLENGE 2026, FINAL

Firstly, **well done** to all!

The results are ...

Thank you for taking part.

YEAR 8 MATHEMATICS CHALLENGE

Final, Oak Room (Hertfordshire Development Centre)

Thursday 11th June 2026

Mel Chrisp

Secondary Mathematics Adviser

HFL Education

FORMERLY HERTS FOR LEARNING