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Year 7 Mathematics Challenge Final

Hertfordshire Development Centre
Friday 27th April 2018



@HfLSecMaths

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Preliminaries

- If your school has more than one team, decide on a 'Team A' and a 'Team B'.
- Make sure you write your team name on each Answer Sheet.
- Units are important! Correct answers with incorrect or missing units will not get full marks.
- Pens/pencils only. No calculators or measuring equipment.
(You will be given a ruler to use in the memory round.)
- 60 marks for each round.

Round 1

**General
Mathematics
Questions**

How many numbers
between 1 and 100
contain the digit '5'
(at least once)?

Round 1

Question 2

A ball is dropped from a height of 125 cm.

Each time it bounces, it bounces back to a height three-fifths of the previous bounce.

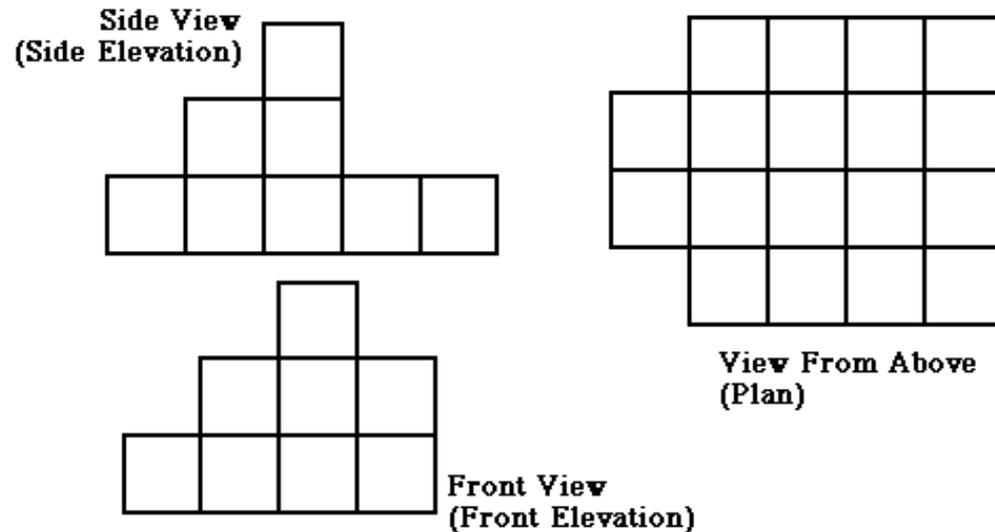
How high does it bounce after the 3rd bounce?

Round 1

Question 3

Hilda was playing with her building bricks.

She made the following object:



How many bricks did Hilda use altogether?

How many 2-digit prime numbers are there which are still prime when you reverse their digits?

Round 1

Question 5

6 years from now, Paula will be 15 years old.

In 9 years' time, the sum of Paula's and Ronny's ages will be 41.

How old is Ronny right now?

Round 1

Question 6

A teacher asked his class to add 2 numbers together.

Adam thought he said "multiply", so he got the answer 48.

Bonnie thought he said "subtract", so she got the answer 13.

What were the two numbers?

End of
Round 1

Round 1: Answers

Q1 19

Q2 27 cm

Q3 23, 24 or 25

Q4 9

Q5 14

Q6 16 and 3

Round 2

**Memory
Round**

Memory Round

We have a hidden mathematical poster.

Two members of your team (the **observers**) are allowed to come and look at the poster.

They must then go back and describe it for the other two people (the **scribes**) to draw.

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.

Memory Round

The observers will have four chances to view the poster.

30 seconds to view
2 minutes to 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.

After this, the team must hand their poster in immediately, with their team name on it.

Only ONE sheet must be handed in per team.

Memory Round

You now have one minute to:

- decide who will be the observers and who will be the scribes;
- find pencils and rubbers, and make sure each scribe is given a ruler;
- decide on tactics!

End of
Round 2

Round 3

Problem- Solving Round

End of
Round 3

Round 3: Answers

Magic squares

6	7	2	4	3	8
1	5	9	9	5	1
8	3	4	2	7	6

Drawing triangles

8 possible triangles

Making 50

5 prime numbers:
 $2 + 3 + 5 + 11 + 29$

Counting triangles

25 triangles

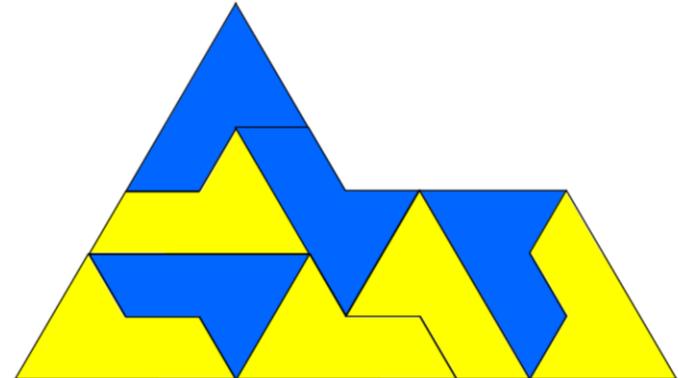
Strangers

Several possible solutions, for example:

6	1	8	3	5	9	2	7	4
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Reptiles

Several possible solutions, for example:



Round 4

**Estimation
Round**

Estimate the mass of the brick.

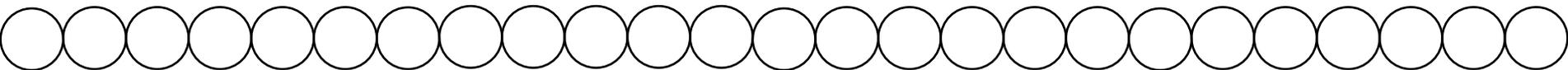


(Write the letter of the brick on the Answer Sheet.)

Round 4

Question 2

If laid face down on the floor, in a straight line, estimate the number of 5p pieces which could fit the width of the Hall.



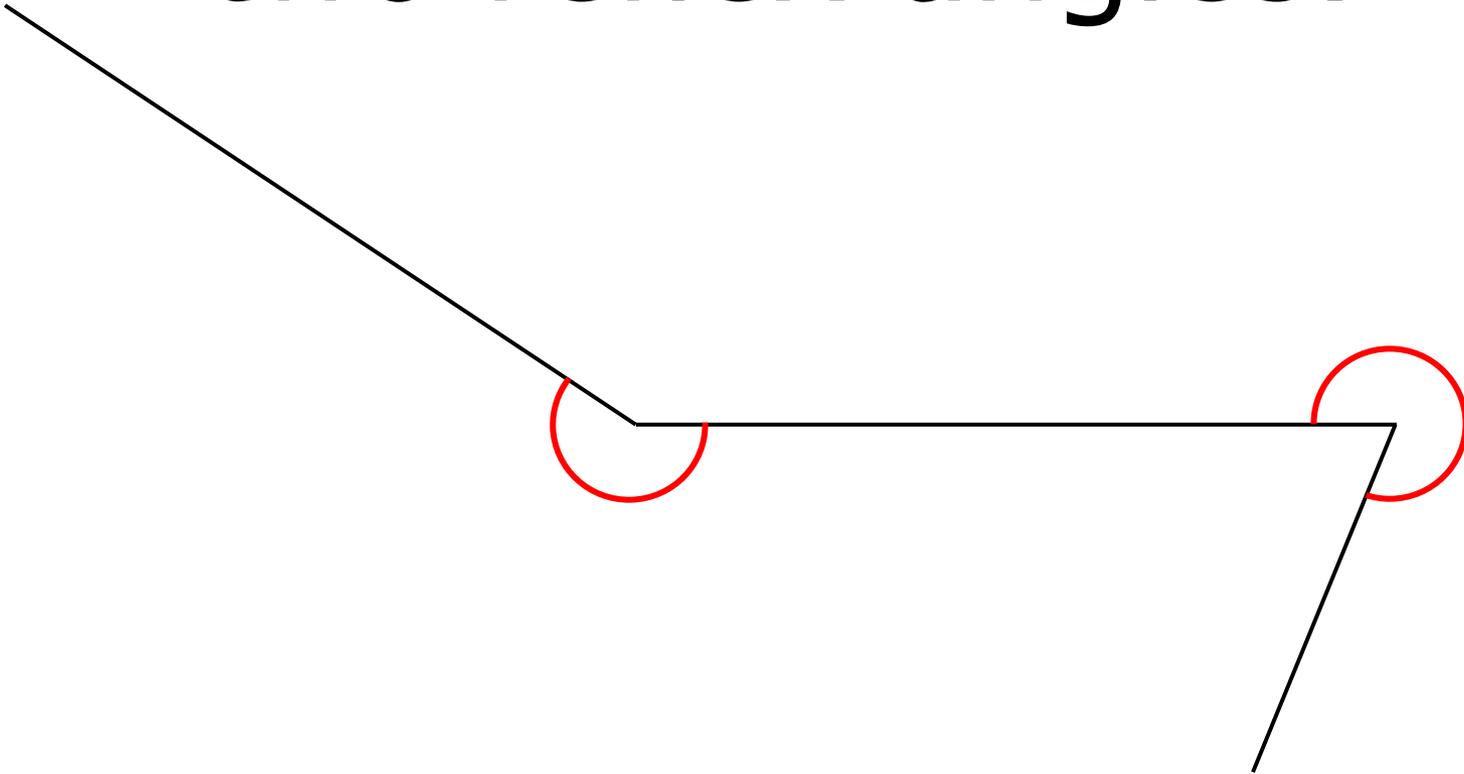
Round 4

Question 3

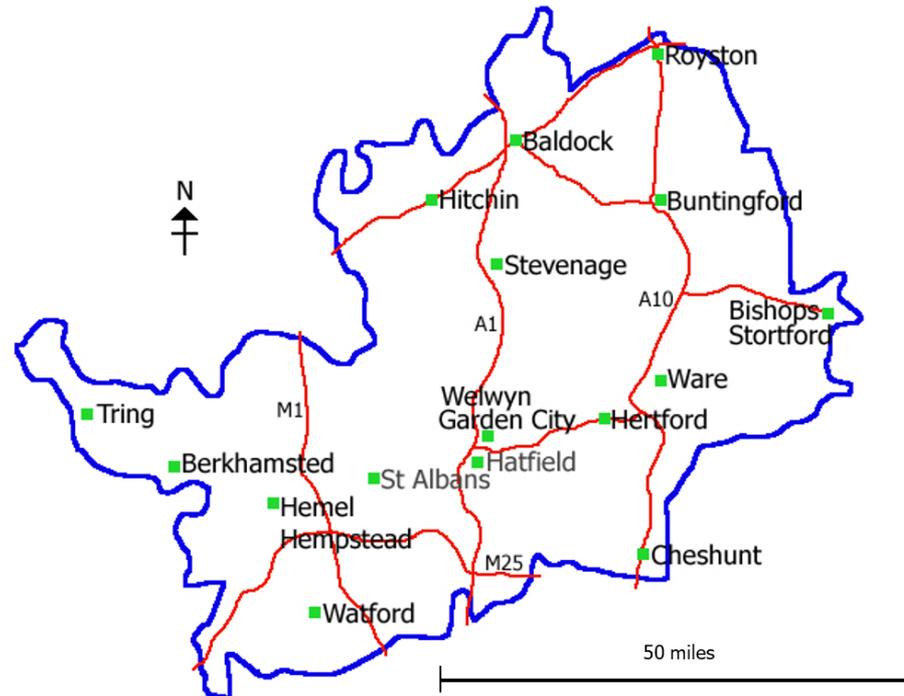
Estimate how many mini-yoghurt pots it would take to fill the tin can.



Estimate the **sum** of the two reflex angles.



Estimate the **area** of the county of Hertfordshire.



Estimate the **time**
for which the
picture of the Eiffel
Tower is displayed.



End of
Round 4

Round 4: Answers

(Equivalent answers in alternative units accepted)

Q1 1,700 to 1,900 grams

Q2 1,400 to 1,600

Q3 7.0 to 8.0

Q4 500° to 510°

Q5 570 to 700 square miles

Q6 26 seconds

Round 5

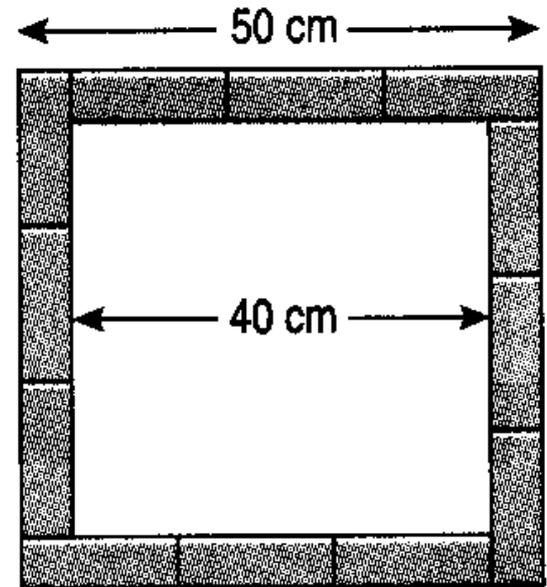
**General
Mathematics
Questions**

Round 5

Question 1

Twelve rectangles, all the same size, are arranged to make a square outline, as shown in the diagram.

Calculate the area of one of the rectangles.



Multiply these 99
fractions:

$$\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \dots \times \frac{98}{99} \times \frac{99}{100}$$

The median of **four** positive integers is $7\frac{1}{2}$. The mean is 7 and the range is 11.

How many possible sets of numbers are there?

Round 5

Question 4

I am a number.

I am greater than 9^2

I am less than 10^2

I am a multiple of 4

I have no odd digits

Add 16 to me and you get a square number.

What number am I?

Round 5

Question 5

I have one sheet from a 50-year old newspaper.

The numbers of the four pages add up to 46.

How many pages must the newspaper have had?

Today is Friday 27th
April.

When is the next year
when 27th April will
fall on a Friday?

End of
Round 5

Round 5: Answers

Q1 75 cm²

Q2 $\frac{1}{100}$

Q3 10

Q4 84

Q5 24

Q6 2029 (or 'in 11 years' time')

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