MATHS WI NAE BORDERS

This mini-competition is inspired by the annual 'Mathématiques sans Frontières' contest. 'Maths wi nae Borders' can be entered by *any* class in Scotland. The five tasks should be completed in less than two hours. Entries must be received by 22nd October 2022.

To enter

- *Head to www.mathsweek.scot/schools/challenges*
- *Select Maths Wi Nae Borders*
- *Fill out the form*
- *Upload your files to the form following the instructions*
- *Await your certificates and keep your fingers crossed you win!*

Some advice from the markers, based on previous competitions:

-Partial solutions and attempts can gain marks.
-Neat and careful work is important
-Remember that we are looking for entries from an entire class (so as a class pick your best solution to each of the five problems).
-Many entries will include correct answers so consider how to make your entry stand out (an excellent answer might include a description of how you approached the question, any extra formulae or strategies you came across or any observations that you think are Mathematically interesting).

The lockers at a school are labelled consecutively starting with locker number one.

The labels cost 50p for each digit.

The total cost for all the digits that are needed is equal to the number of lockers.

How many lockers are there?
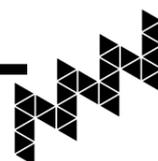
Maths Week Scotland

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Wee Jimmy plays a game with a 5x5 grid. He picks a square and tries to draw a line that moves across the edges between the squares and goes through every square exactly once.

For his first shot Jimmy starts in the top right and makes this pattern:

START HERE
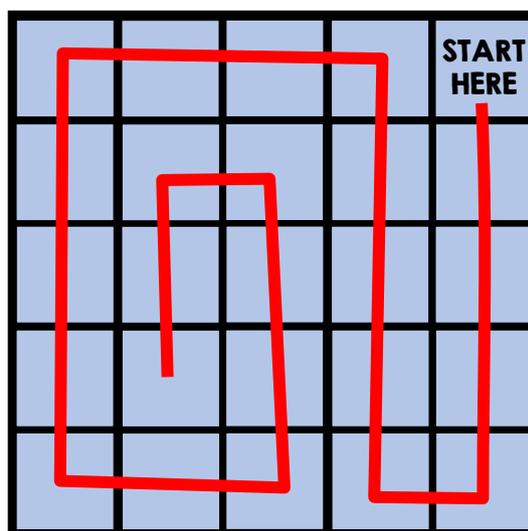
For his second shot, he picks the middle square and makes this pattern:

START HERE
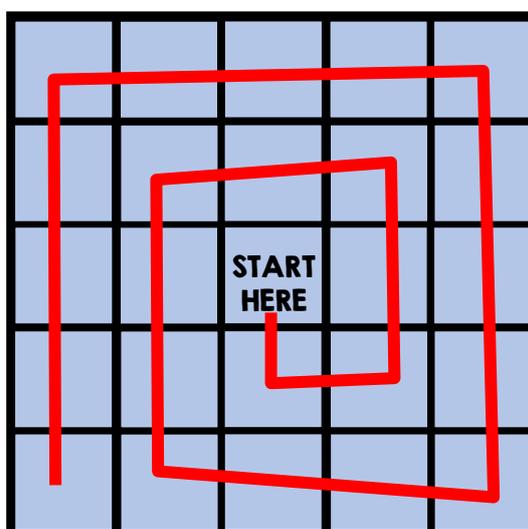
Jimmy thinks that some starting squares will be harder than others.

Which squares can YOU use as starting points for patterns that visit every square?

Maths Week
Scotland

Twa Mathematicians, Phil and Jill, huv a deck of seven hunner shuffled cairds, labelled fae wan tae seven hunner.

Baith o them grabbed a random caird. They had a swatch at their ane card but Phil didnae show Jill his, and she didnae show hers to Phil either.

Phil pipes up "Ma number's prolly smaller than yours"
Jill replies "Mine's prolly smaller".
Phil's thinks for twa seconds then announces "It's 50-50 whether mine's smaller".

Can you sort oot this carfuffle? Whit caird dis Phil huv? Explain yer answer.

Give your answer to this question in Gaelic or Scots using a minimum of 30 words.

Bha pacaid de 700 chairtean uile le àireamh eadar 1-700 aig dithis eòlaich-Matamataig, Phil agus Jill, agus chaidh na cairtean a mheasgachadh.

Thagh an dithis aca cairt bho mheadhan a' phìle gun sùil a thoirt air a' chairt a thagh iad an toiseach. Choimhead iad ris a' chairt aca fhèin, ach cha do sheall Phil a' chairt aige dha Jill, agus cha do sheall Jill a' chairt aicese dha Phil.

Thuirt Phil: "Tha e coltach gu bheil an àireamh agamsa nas lugha na an àireamh agadsa."
Fhreagair Jill: "Tha e nas coltaiche gu bheil an tè agamsa nas lugha."
Tha Phil a' smaoineachadh agus an uair sin tha e ag ràdh "Tha coltas 50/50 ann gu bheil an tè agamsa nas lugha."

Dè a' chairt a bh' aig Phil? Mìnich do fhreagairt.

Maths Week
Scotland

**Alberto writes down a list of numbers.
The first number is 3.2 and to find the next number he uses this rule:**

Swap the whole number part with the decimal part
(so 3.2 becomes 2.3)

then subtract the smaller number from the bigger one
(so 3.2 – 2.3 = 0.9)
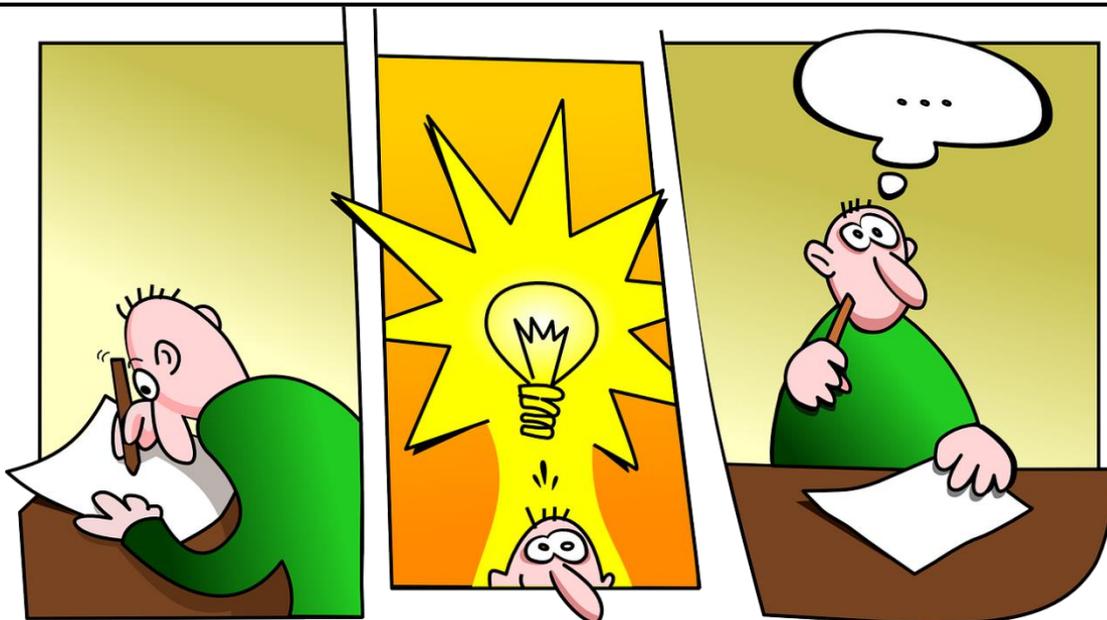
Then Alberto uses this new number and applies the rule again, and again, and again... He ends up with a sequence of numbers 3.2, 0.9, 8.1...

a) Find the 17th number on Alberto's list.

b) See if you can figure out a way to work out the 2022nd number on Alberto's list.

Two circular racing tracks have the same radius. They both pass through the centre of the other track and intersect at points A and B.

The blue car starts at point A, goes round the blue track clockwise at a constant speed and completes a circuit in 1 minute 12 seconds.

The pink car starts at point B, goes round the pink track clockwise at a constant speed and completes a circuit in 1 minute 15 seconds.

A

B
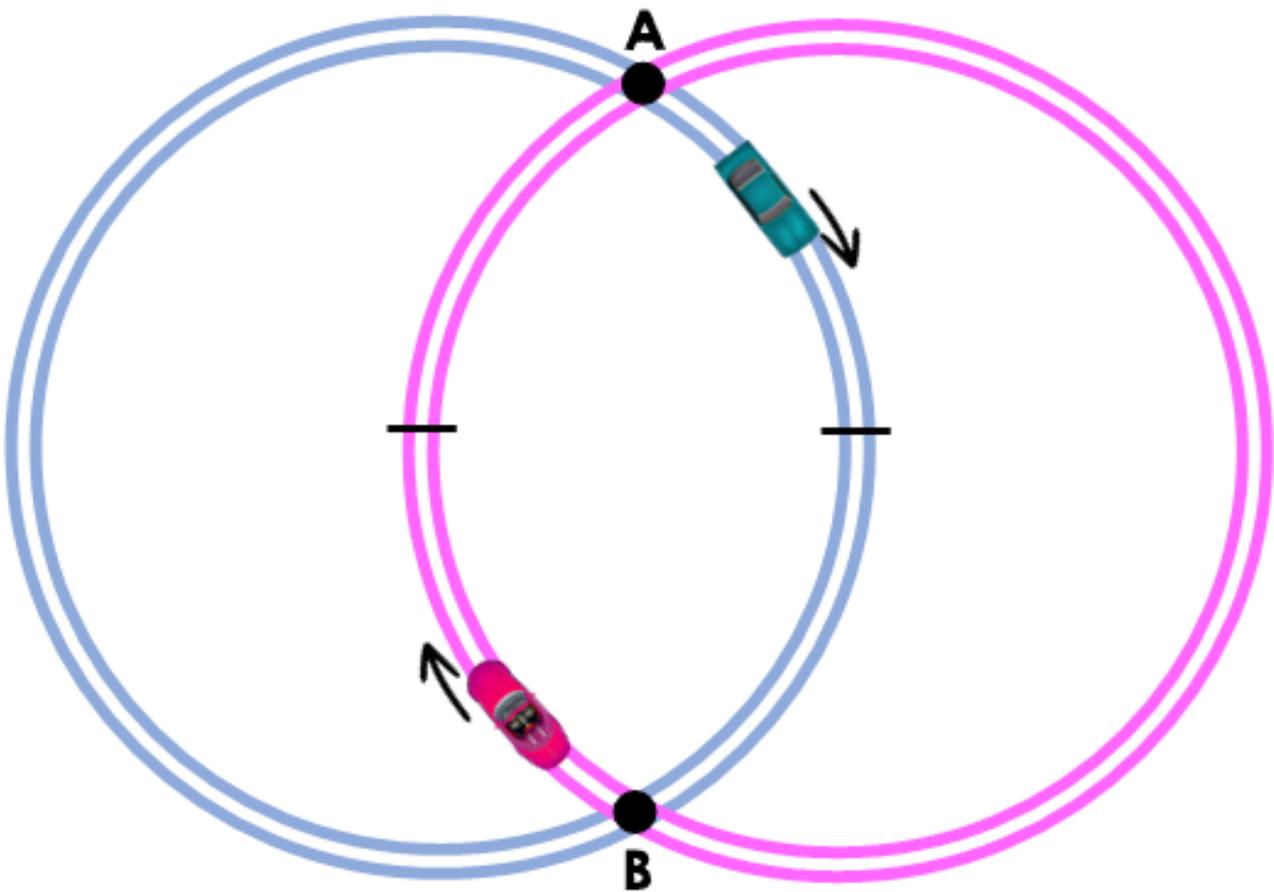
When will they collide? Explain your answer!