Sum tricks

Sum trick 1

- Choose 2 numbers (they can be any size, but make sure you can do arithmetic with them easily, so no huge 7 digit numbers…..)

_____ & _____

- Make a sequence by adding the previous 2 terms together (so start with adding your previous two chosen numbers)

_____ + _____ = _____

_____ + _____ = _____

_____ + _____ = _____

_____ + _____ = _____

_____, _____, _____, _____,

- Add your 10 results together (including your first two chosen numbers)
- Show your sequence to your teacher
- Without using a calculator, your teacher will be able to tell you your sum quickly.
- How????
- See if you can use some algebra to prove a link between some terms in the sequence and the sum of the 10 terms.

Sum trick 2

1) Choose a digit _____

2) Repeat the digit 3 times to make a 3 digit number _____

3) Add the digits together _____

4) Divide your 3 digit number by the sum _____

5) Write down your answer _____

6 Try some other digits. See what the result is.

7) Explain what is happening!!!

- What about other numbers?

Choose a digit. Write it 4 times to make a 4 digit number. Divide it by 4 x the digit. Write down your result.

Choose another digit and repeat the same process. Do you always get the same result? Why or why not?

Can you simplify the results? Fill in the form below to see how many sums will have integer solutions. You don't need the answer, don't use a calculator, just see if you can work out whether you will get an integer solution or not.

Number	Integer solution? (Guess Yes/No)	Actual solution
111		
1,111		
11,111		
111,111		
1,111,111		
11,111,111		
111,111,111		
1,111,111,111		
11,111,111,111		
111,111,111,111		

Some tests of divisibility are easier than others. Try and describe the divisibility test you used. There is a divisible by 7 test detailed with steps you can follow.

Divisible by 4 _____

Divisible by 5 _____

Divisible by 6 _____

Divisible by 7 _____

Divisible by 8 _____

Divisible by 9 _____

Divisible by 10 _____

Divisible by 11 _____

Divisible by 12 _____

Divisible by 7 method

- Choose any 4 digit number _____
- Take the last digit of your number and multiply it by 5 _____
- Add it to your original number _____
- Is your result divisible by 7? Yes/No/Don't know
- If you don't know, repeat the algorithm
- Take the last digit, multiply it by 5 _____
- Add it to the rest of your number _____
- Is your result divisible by 7? Yes/No/Don't know
- If you don't know, repeat the algorithm
- Take the last digit, multiply it by 5 _____
- Add it to the rest of your number _____
- Is your result divisible by 7? Yes/No/Don't know
- If you don't know, repeat the algorithm

Can you apply this algorithm to the 7 digit number in the number trick we are exploring?

This algorithm was discovered by a student during their summer holidays! You can read about it here

https://www.westminsterunder.org.uk/announcements/

and a proof is here

https://www.simonellismaths.com/post/new-maths

You can represent the steps in a diagram