



# Advanced Mathematics Support Programme®

Managed by

**MEI** Mathematics®  
Education  
Innovation

# Sum trick

- Choose two numbers (i.e 16 and 23)
- Write them down
- Add them together (39)
- Continue to add the previous two numbers together (can you remember what sequence this reminds you of?)
- Do this so you have 10 terms
- (example = 16,23,39,62,101,163,264,427,691,1108)

- Add your 10 numbers.
- Don't show your answer! Give your teacher your sequence. They can work out the answer straight away.
- HOW??????

# The ?? trick

- Choose a digit between 1 and 9 (for example 5)
- Write down the digit 3 times to turn it in to a 3 digit number. (if you wrote down 5 you should now have 555).
- Add your multiply your digit by 3.
- Divide your two numbers. (for example  $555 \div 15$ )
- Write your answer down.
- Compare your answer to your neighbour.
- Prove your result.

# But how?

- Does the digit you choose ever affect the answer?
- Can you prove how it works?
- Do you get a similar result for a 4 digit number ( $aaaa \div 4a$ )? Or 5 digit?
- Will it work for any number?

# Integers

- What length numbers give integer solutions?
- What is the simple sum you can do for each length to see if you can get an integer solution?

Try to decide whether these will have integer solutions/  
 Don't use a calculator – you don't need to work out the solution,  
 just decide whether the solution will be an integer 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		

# ANSWERS AFTER THIS SLIDE



# Sum trick

- Start with two numbers,  $x$  and  $y$
- Add the two previous terms
- The sequence is as follows
- $x, y, x+y, x+2y, 2x+3y, 3x+5y, 5x+8y, 8x+13y, 13x+21y, 21x+34y$
- The sequence sums to  $55x+88y$
- This is 11 times the 7<sup>th</sup> term

# The ?? trick

- Take digit  $a$
- Your new number  $aaa$  is  $111a$
- $a+a+a = 3a$
- $111a \div 3a = \frac{111a}{3a} = \frac{111}{3} = 37$

Number	Integer solution? (Guess Yes/No)	Actual solution
111	Y	37
1,111	N	277.75
11,111	N	2,222.2
111,111	N	18,518.5
1,111,111	N	158,730.142857...
11,111,111	N	1,388,888.875
111,111,111	Y	12,345,679
1,111,111,111	N	111,111,111.1
11,111,111,111	N	1,010,101,010.090909
111,111,111,111	N	9,259,259,259.25

# About the AMSP

- A government-funded initiative, managed by MEI, providing national support for teachers and students in all state-funded schools and colleges in England.
- It aims to increase participation in AS/A level Mathematics and Further Mathematics, and Core Maths, and improve the teaching of these qualifications.
- Additional support is given to those in priority areas to boost social mobility so that, whatever their gender, background or location, students can choose their best maths pathway post-16, and have access to high quality maths teaching.

# Contact the AMSP



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