

STRETCH AND CHALLENGE

ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION | QUESTION 1

Two 4-digit numbers have a sum of 5,000 and a difference of 2,160

a) Find the two numbers.

b) Copy and continue the table below to show how the two numbers change when the sum increases by 100 and the difference remains the same.

What do you notice?

Number 1	Number 2	Sum	Difference
		5,000	2,160
		5,100	2,160
		5,200	2,160

c) Draw a table to show how the two numbers change when the difference increases by 100 and the sum remains the same.

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ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION | QUESTION 1

ANSWERS

a) 3580 and 1420

b)

Number 1	Number 2	Sum	Difference
3580	1420	5,000	2,160
3630	1470	5,100	2,160
3680	1520	5,200	2,160

Both numbers increase by 50

c)

Number 1	Number 2	Sum	Difference
3580	1420	5,000	2,160
3630	1370	5,000	2,260
3680	1320	5,000	2,360

The greatest number increases by 50 and the smallest number decreases by 50

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ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION | QUESTION 2

Here are 5 consecutive numbers:

3, 4, 5, 6, 7

- a) Find the sum of the numbers.
- b) Find the sum of other sets of 5 consecutive numbers.
What patterns do you notice?
Can you find a rule?
- c) Can you predict a rule for adding 4, 6 or 7 consecutive numbers?
- d) Investigate and see if your predictions are correct.

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ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION | QUESTION 2

ANSWERS

- a) 25
- b) Any set of 5 consecutive numbers sum to a multiple of 5
- c) Predictions may vary. Children may predict that:
- 4 consecutive numbers sum to a multiple of 4,
 - 6 consecutive numbers sum to a multiple of 6
 - 7 consecutive numbers sum to a multiple of 7
- d) The rule works for odd quantities of consecutive numbers.
- 7 consecutive numbers sum to a multiple of 7
 - 4 consecutive numbers sum to a multiple of $4 + 2$
 - 6 consecutive numbers sum to a multiple of $6 + 3$

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ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION | QUESTION 3

The number 67 is the 19th prime number when all the primes are listed in order.

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67

19 is also a prime number.

This means that 67 is super prime because it is a prime number with a prime numbered position in the sequence of prime numbers.

- a) List the other super primes that are less than 100
- b) Is it possible to show 67 as:
 - A sum of 2 prime numbers?
 - A sum of 3 prime numbers?
 - A sum of 5 consecutive prime numbers?

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ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION | QUESTION 3

ANSWERS

a) 3 (the 2nd prime)
17 (the 7th prime)
59 (the 17th prime)

5 (the 3rd prime)
31 (the 11th prime)
67 (the 19th prime)

11 (the 5th prime)
41 (the 13th prime)
83 (the 23rd prime)

b) It is not possible to show 67 as sum of 2 primes as (except for 2) primes are odd. $2 + 65 = 67$ but 65 is not prime. 2 odd numbers will always sum to an even number.

There are many combinations of three primes that sum to 67, for example, 3, 5 and 59 and 3, 11 and 53

The five consecutive primes 7, 11, 13, 17 and 19 sum to 67

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ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION | QUESTION 4

Always true, sometimes true or never true?

For each answer explain your reasoning using examples.

- a) The product of 2 odd numbers is even.
- b) Each block of 100 numbers within 1,000 (0-99, 100-199, 200-299 etc) has at least one cube number.
- c) Multiples of 18 have a digit sum of 9
- d) Multiples of 18 are multiples of 6
- e) Multiples of 6 are multiples of 18

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ANSWERS

- a) Never true. The product of 2 odd numbers is always odd.
- b) Sometimes true. For example, 7^3 is 343 and 8^3 is 512, there is no cube number between 400-499
- c) Always true (sometimes you need to add the digits more than once to get to a single digit of 9

e.g. $18 \times 27 = 486$, $4 + 8 + 6 = 18$, $1 + 8 = 9$

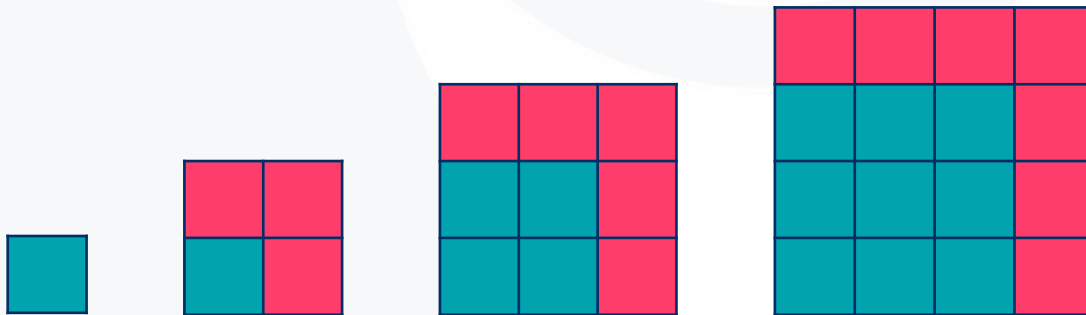
- a) Always true
- b) Sometimes true

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ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION | QUESTION 5

9 is a square number.
It is the product of 3×3

- List the square numbers to 100 in order.
- Now find the difference between each consecutive square number.
What do you notice? Can you find a rule?
- Copy and continue the pattern below. Can you use this pattern to explain the rule you noticed?



STRETCH AND CHALLENGE

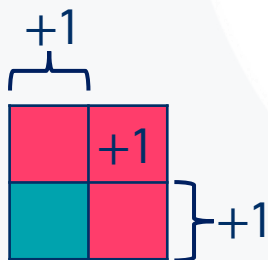
ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION | QUESTION 5

ANSWERS

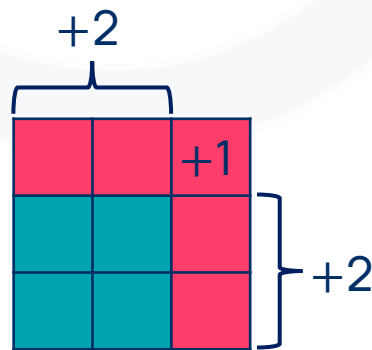
a) 1, 4, 9, 16, 25, 36, 49, 64, 81, 100

b) The difference between consecutive pairs of square numbers is an ascending odd number pattern. For example, the difference between 1 and 4 is 3, the difference between 4 and 9 is 5, the difference between 9 and 16 is 7

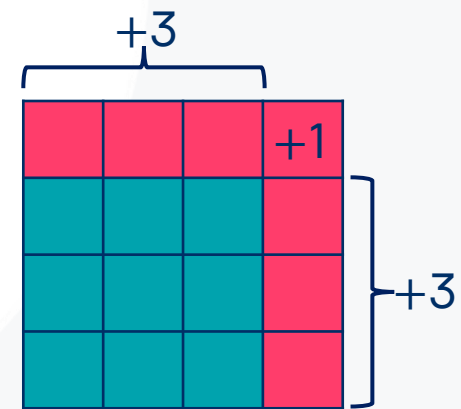
c) The pink squares show what has been added each time.



$$(2 \times 1) + 1 = 3$$



$$(2 \times 2) + 1 = 5$$



$$(2 \times 3) + 1 = 7$$