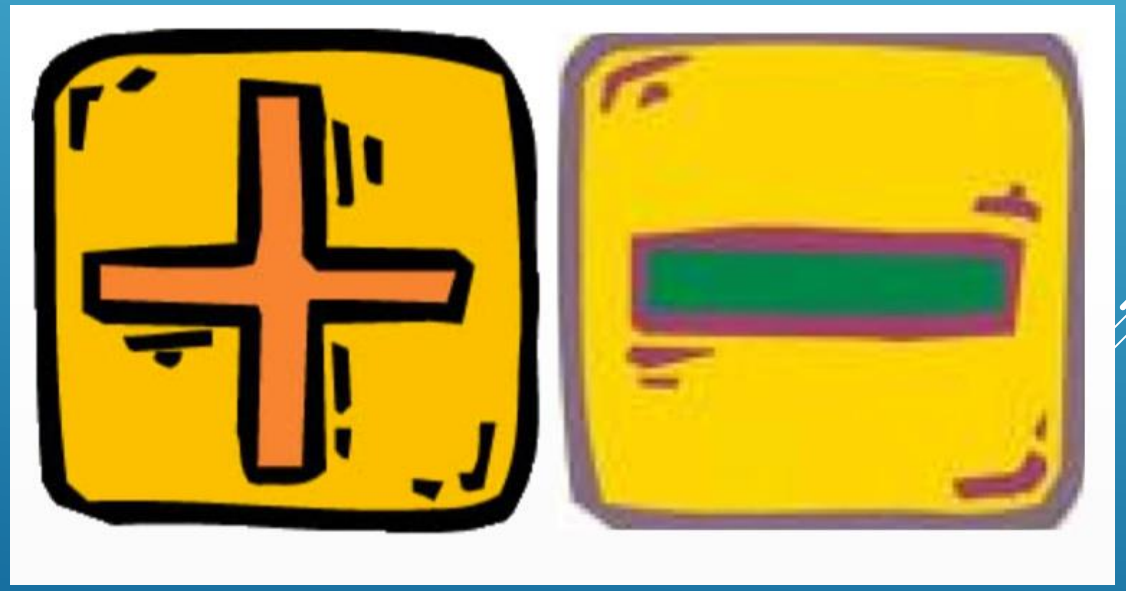
KS1 Calculation: Parent Workshop



OBJECTIVES

- To understand the addition and subtraction strategies taught at Days Lane in KS1.
- To understand the CPA approach of addition and subtraction.
- To know how to support your child at home with addition and subtraction.

NATIONAL CURRICULUM EXPECTATIONS – YEAR 1

Statutory requirements

Pupils should be taught to:

- read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ – 9.

NATIONAL CURRICULUM EXPECTATIONS – YEAR 2

Statutory requirements

Pupils should be taught to:

- solve problems with addition and subtraction:
  - using concrete objects and pictorial representations, including those involving numbers, quantities and measures
  - applying their increasing knowledge of mental and written methods
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

WHAT IS THE CPA APPROACH?

- Concrete, Pictorial, Abstract (CPA) is a highly effective approach to teaching that develops a deep and sustainable understanding of maths in pupils. Often referred to as the concrete, representational, abstract framework, CPA was developed by American psychologist Jerome Bruner. It is an essential technique within the method of teaching maths for mastery.
- Children often find maths difficult because it is abstract. The CPA approach helps children learn new ideas and build on their existing knowledge by introducing abstract concepts in a more familiar and tangible way.
- The CPA method involves using actual objects for children to add, subtract, multiply or divide. They then progress to using pictorial representations of the object, and ultimately, abstract symbols.

CONCRETE

- At Days Lane in KS1 we primarily use numicon as the concrete representation of number.
- Numicon is a maths resource that uses a series of structured images to represent numbers.

Why use Numicon?

- Children can understand number relationships
- Children can do calculating without counting (subitising)
- Children learn mathematical language
- Children learn to make connections and to use and apply their understanding.

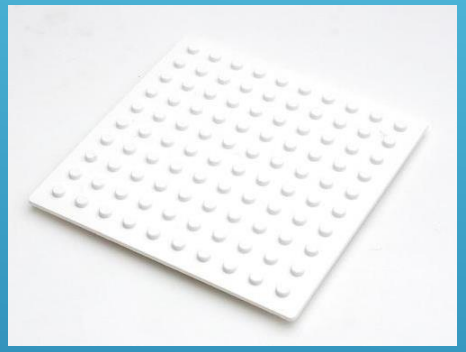
numicon

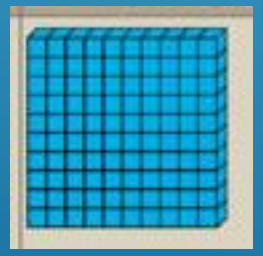
= number + icon

CONCRETE

Links to Base 10

H





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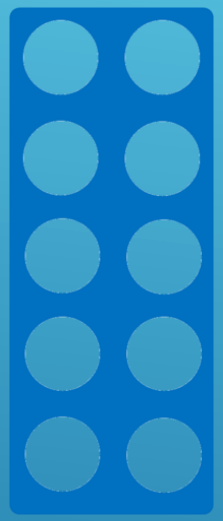

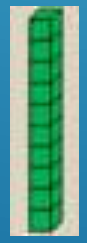

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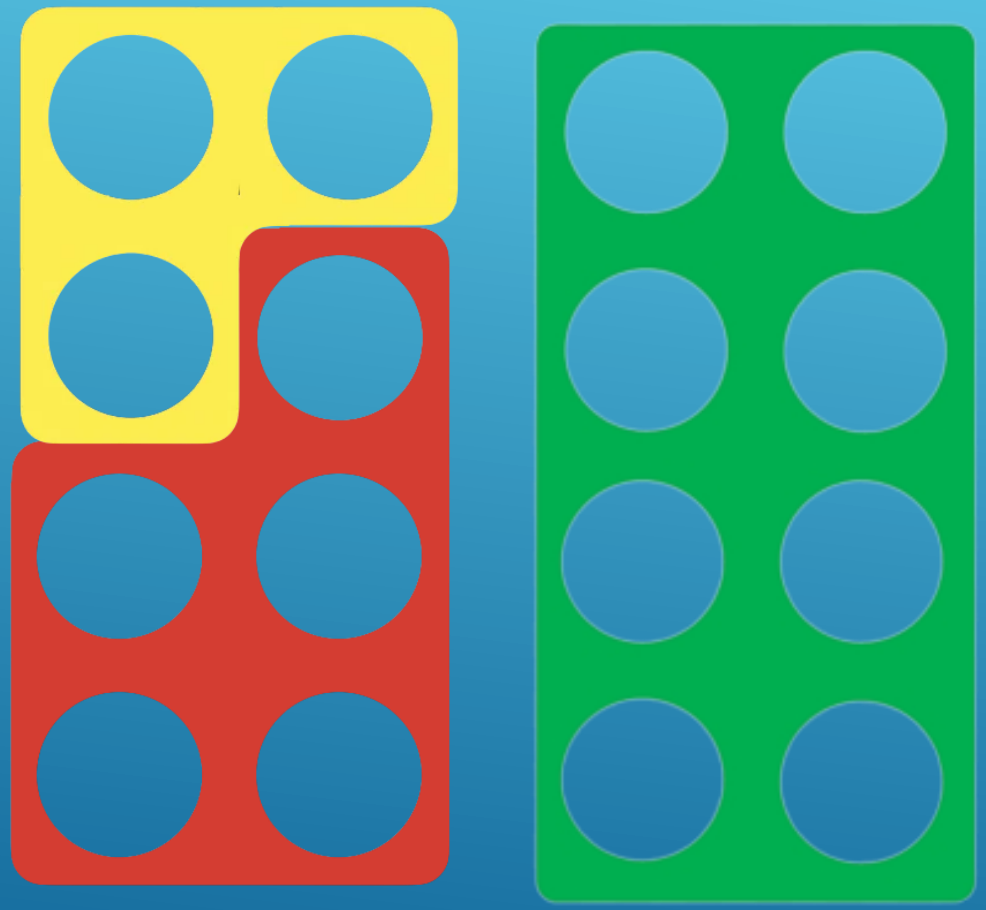
*Base 10 is a resource that children are introduced to in Year 2 when they begin to explore larger numbers.

CONCRETE

Addition- within 10

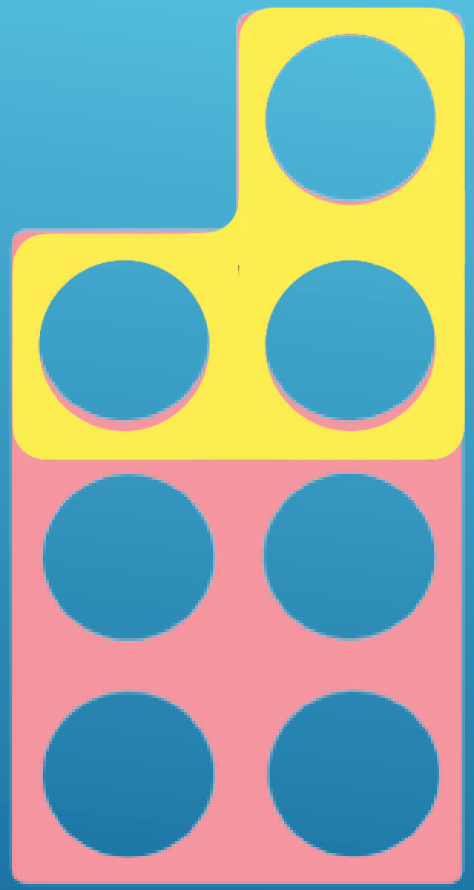
$5 + 3 = 8$



CONCRETE

Subtraction – within 10

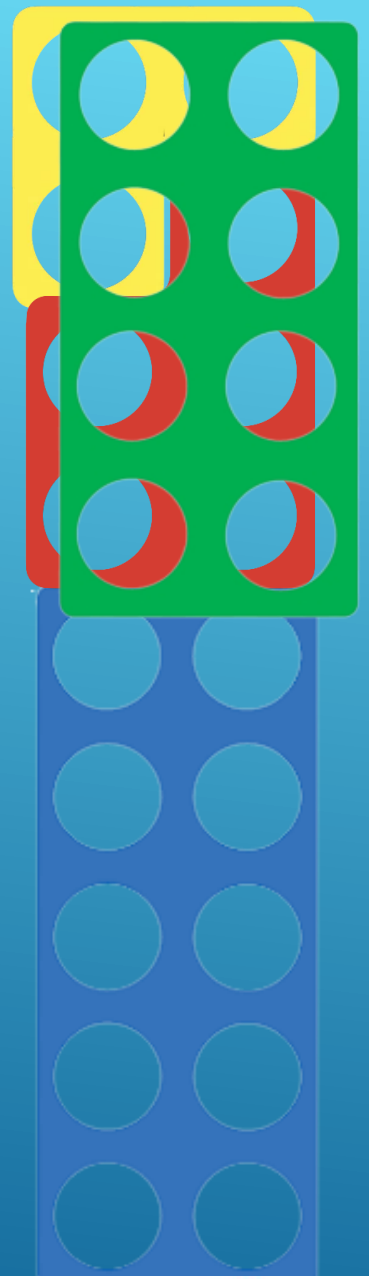
$7 - 3 = 4$



CONCRETE

Addition- within 20

15 + 3 = 18

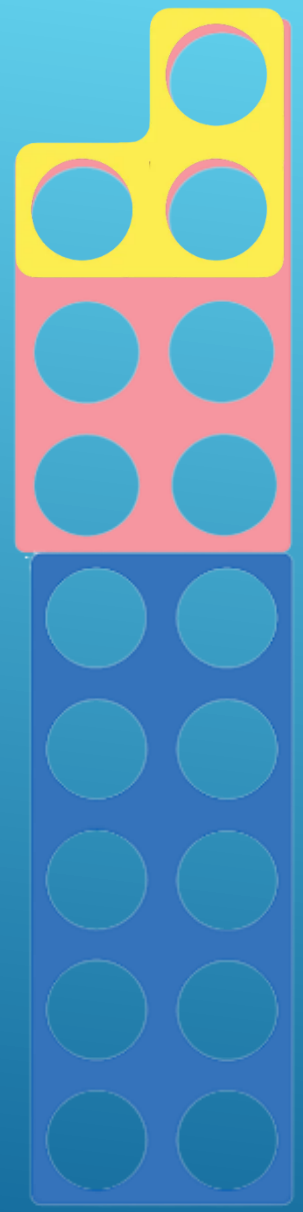


- add and subtract one-digit and two-digit numbers to 20, including zero

CONCRETE

Subtraction – within 20

17 – 3 = 14

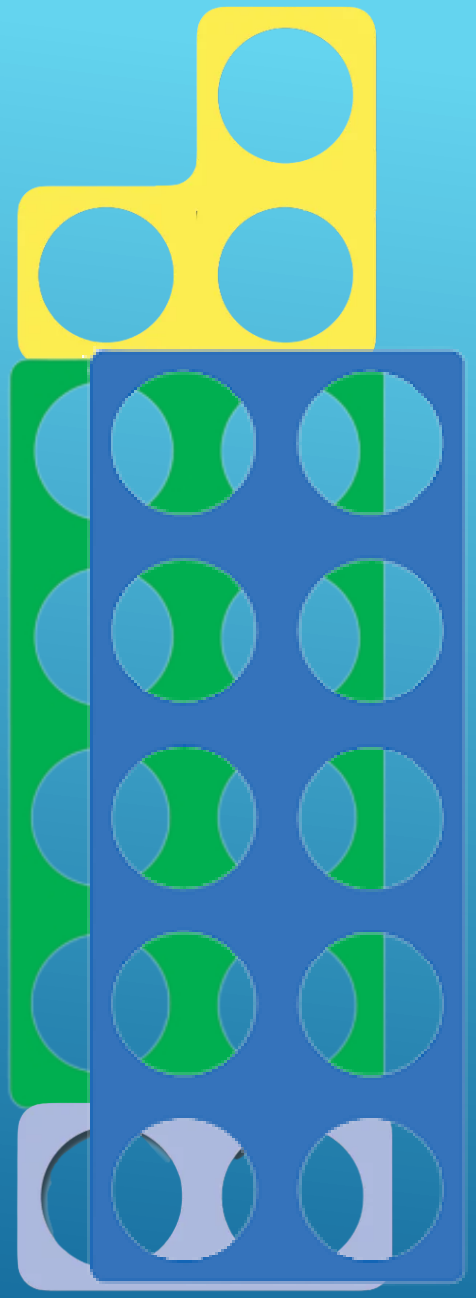


- add and subtract one-digit and two-digit numbers to 20, including zero

CONCRETE

Addition- 3 1 digit numbers

3 + 2 + 8 = 13

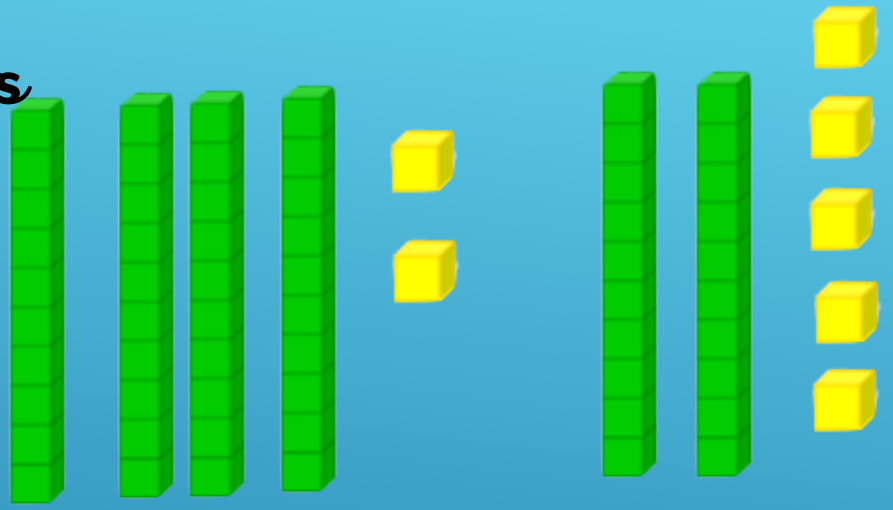


- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers

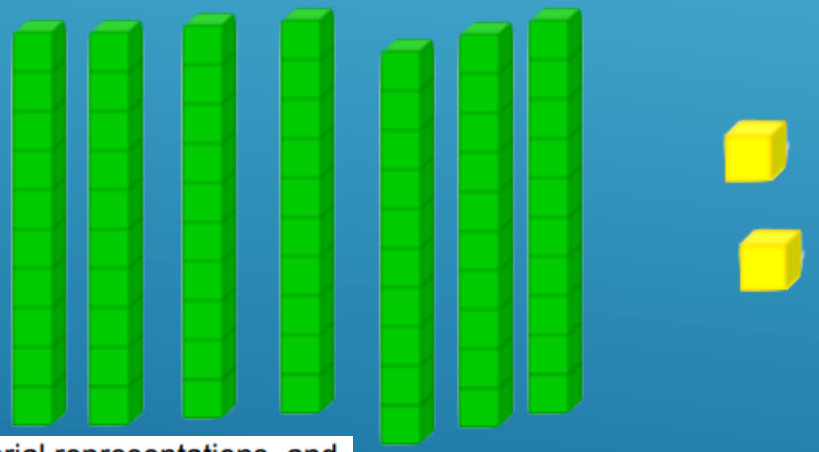
CONCRETE

Addition- 2 digit numbers

42 + 25 = 67



47 + 25 = 72



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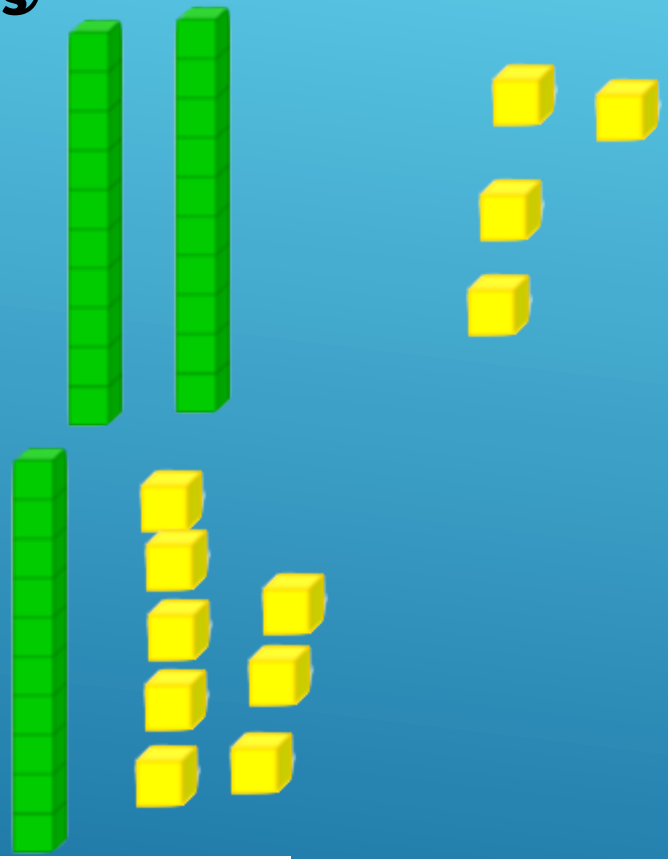
  - adding three one-digit numbers

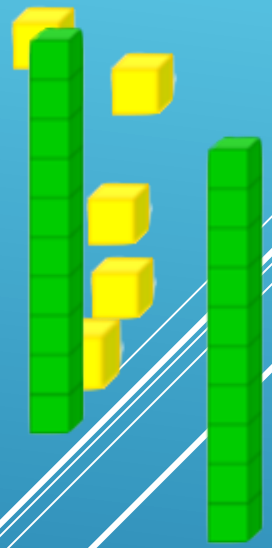
CONCRETE

Subtraction- 2 digit numbers

38 – 14 = 24



32 – 14 = 18



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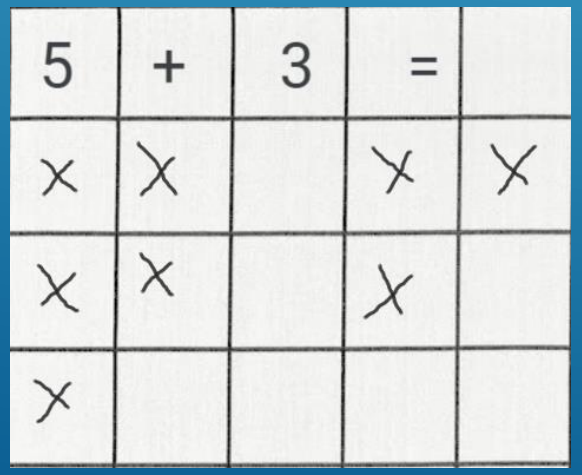
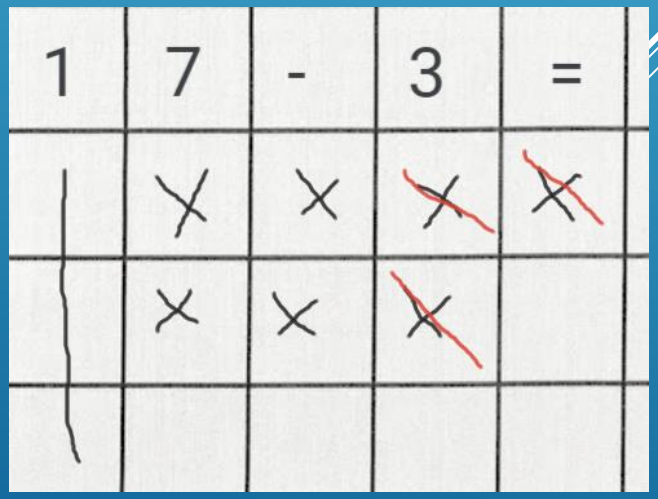
PICTORIAL

- Once children have understood the concrete stage to addition and subtraction they can move onto the pictorial stage.
- The pictorial stage requires the children to draw simple pictures to represent the numbers in the equation.
- We draw crosses to represent the ones in a number and lines to represent the tens. This is consistent across the school.





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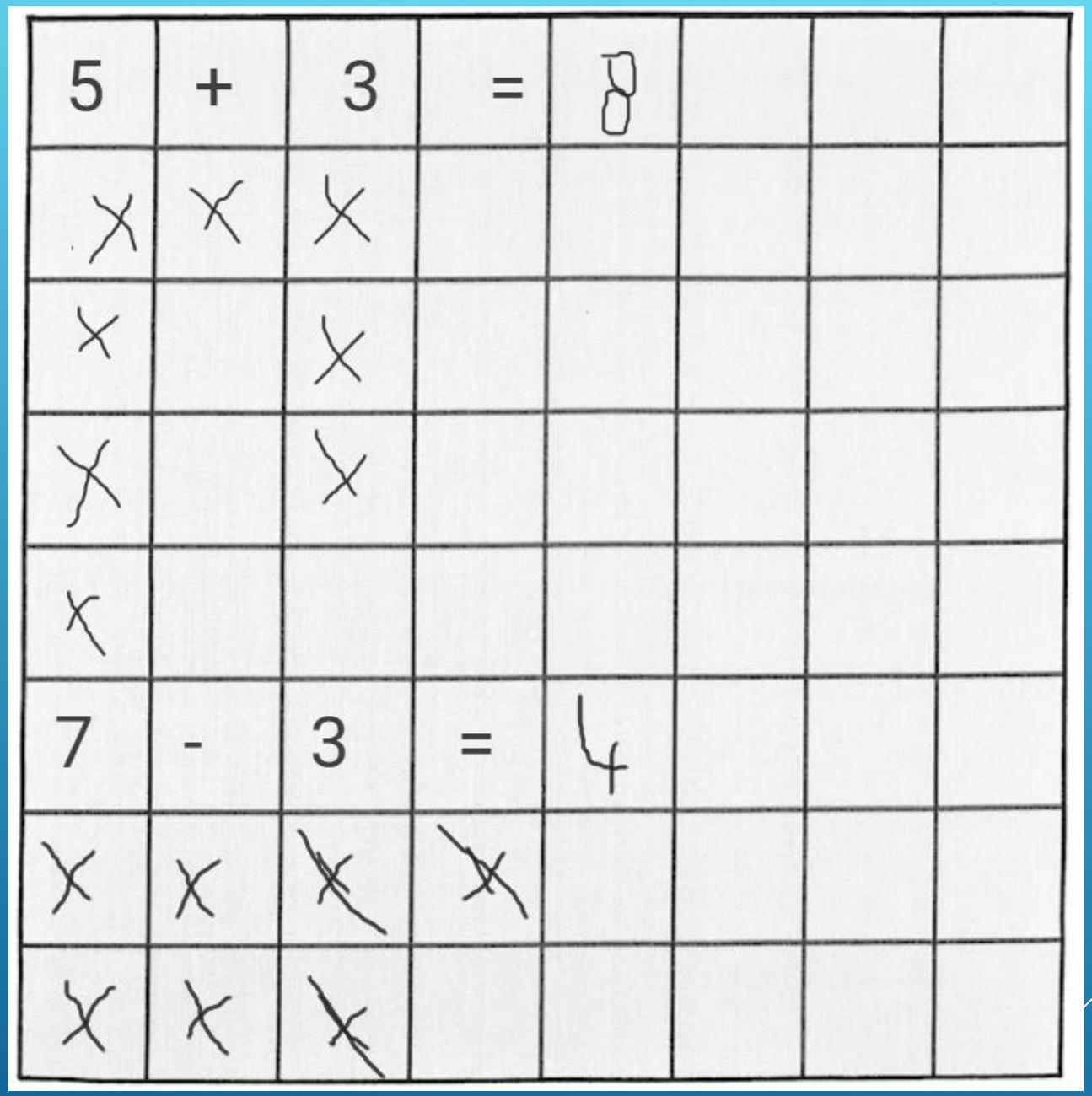

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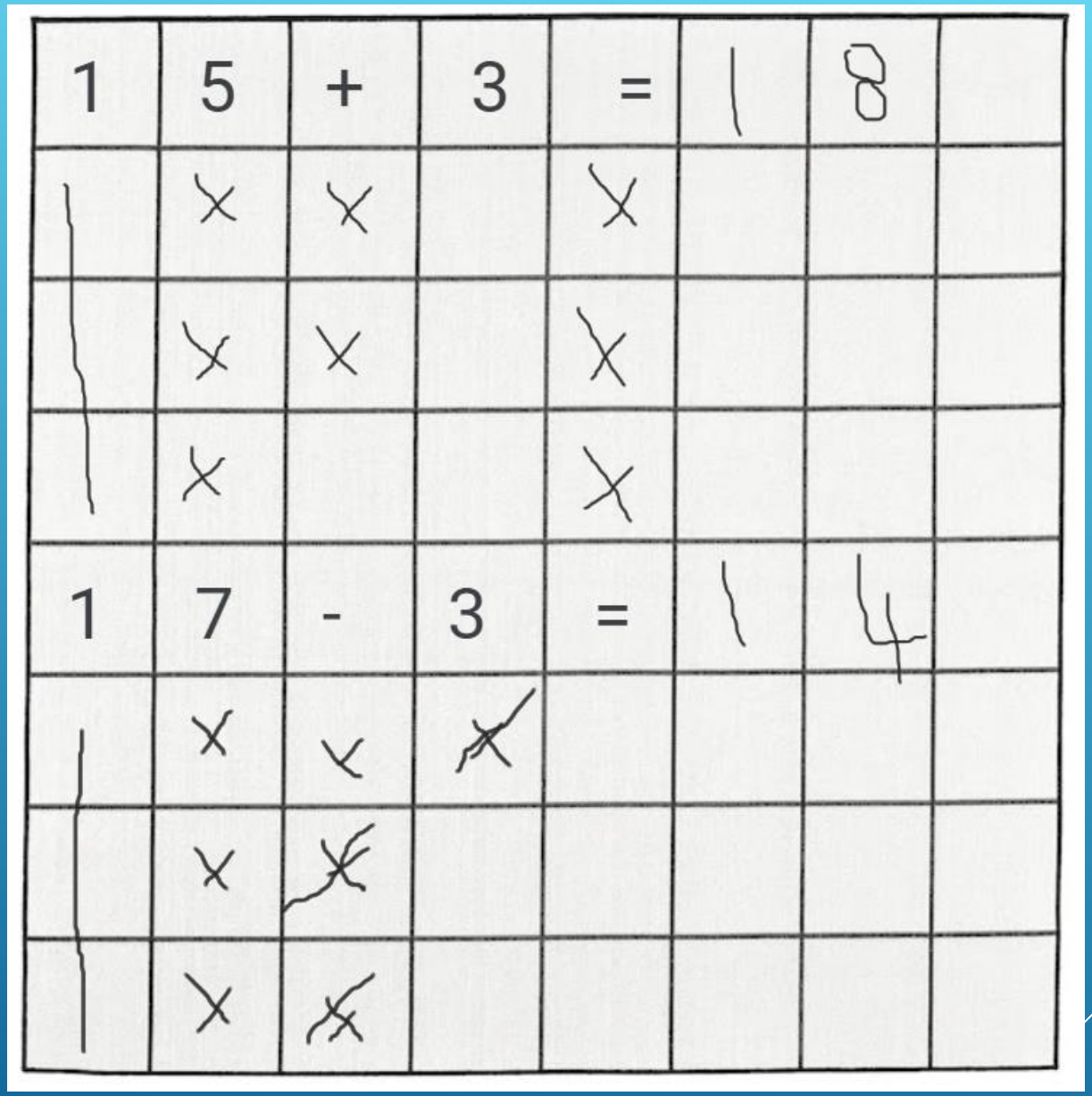

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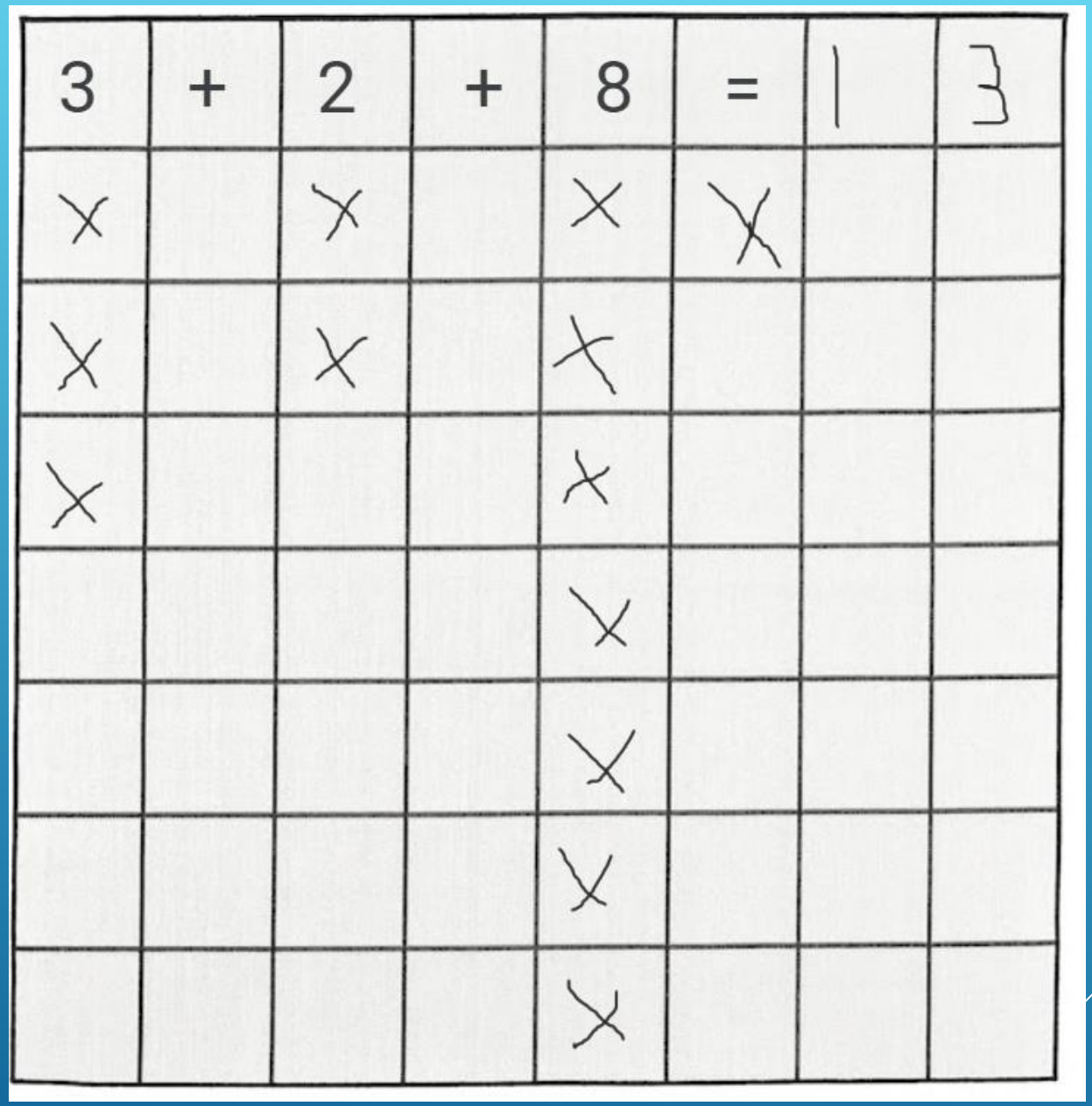

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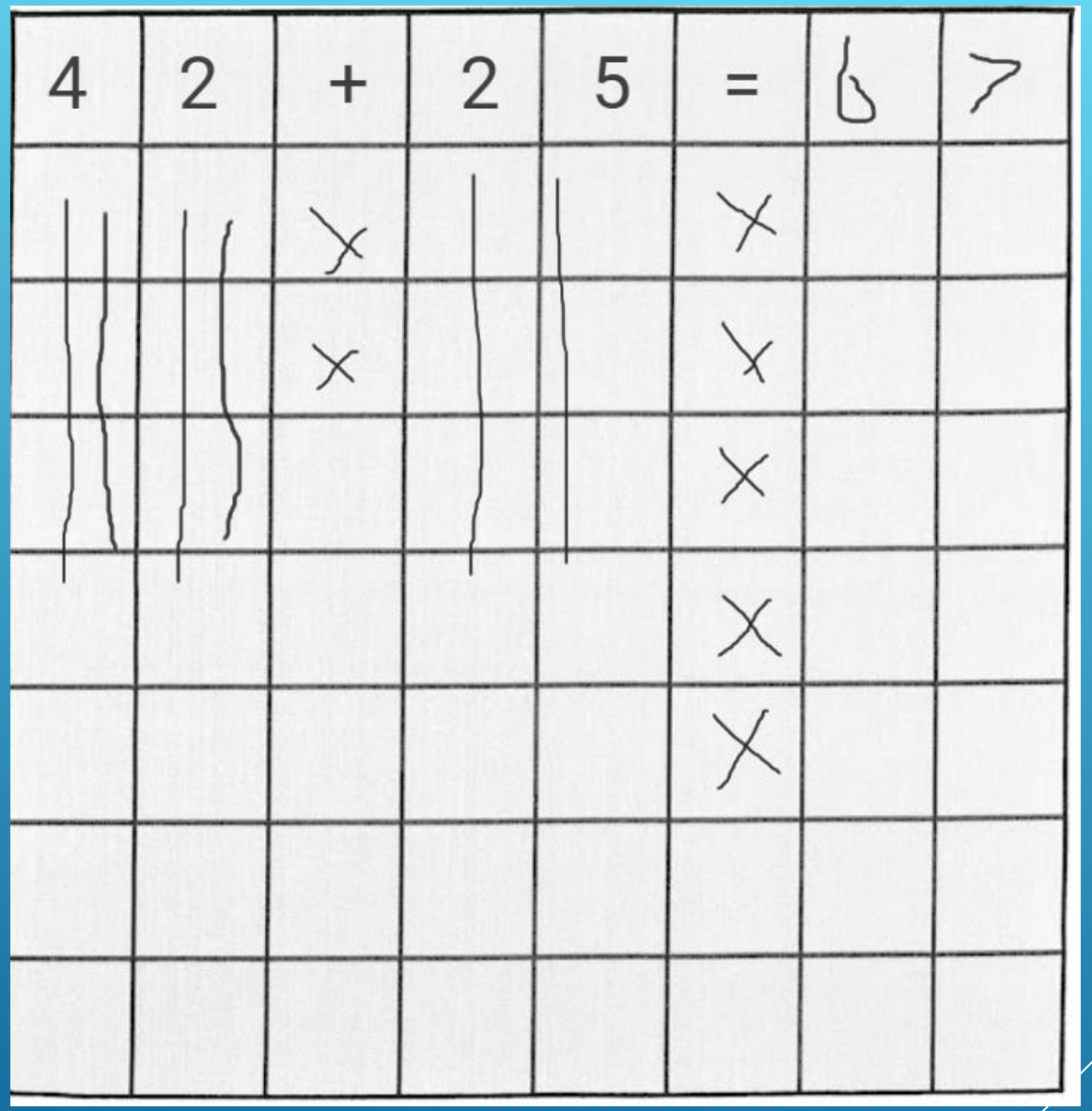

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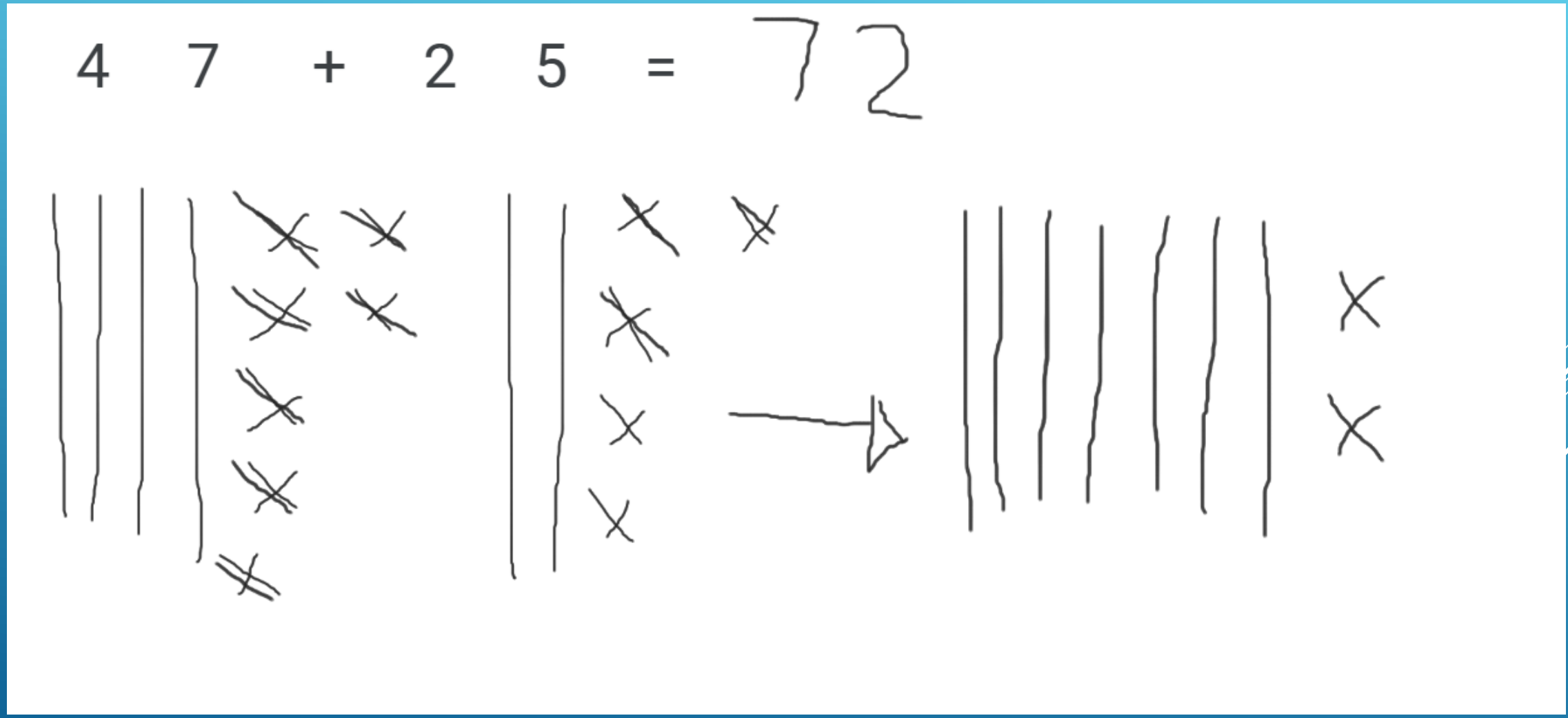

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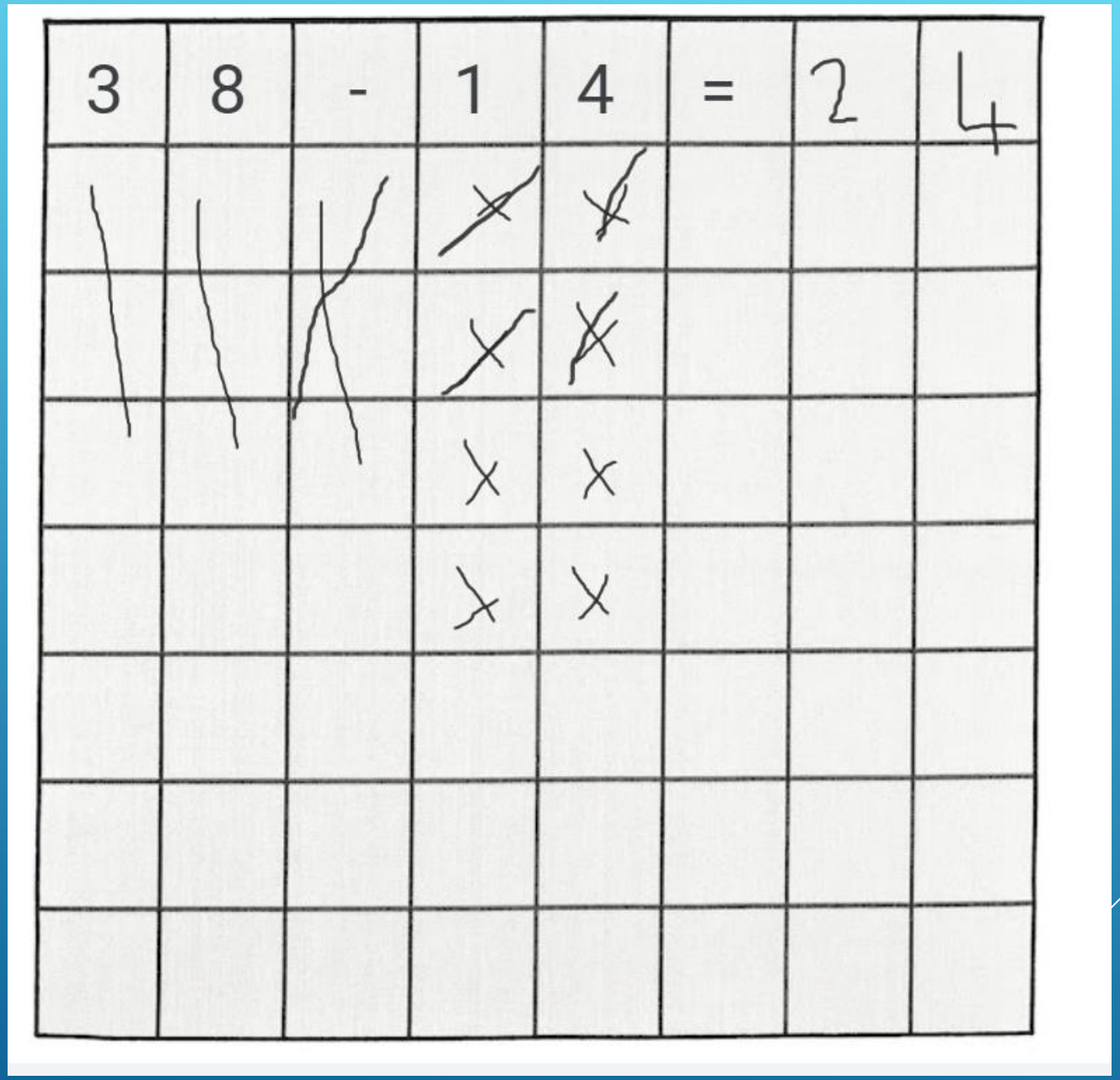

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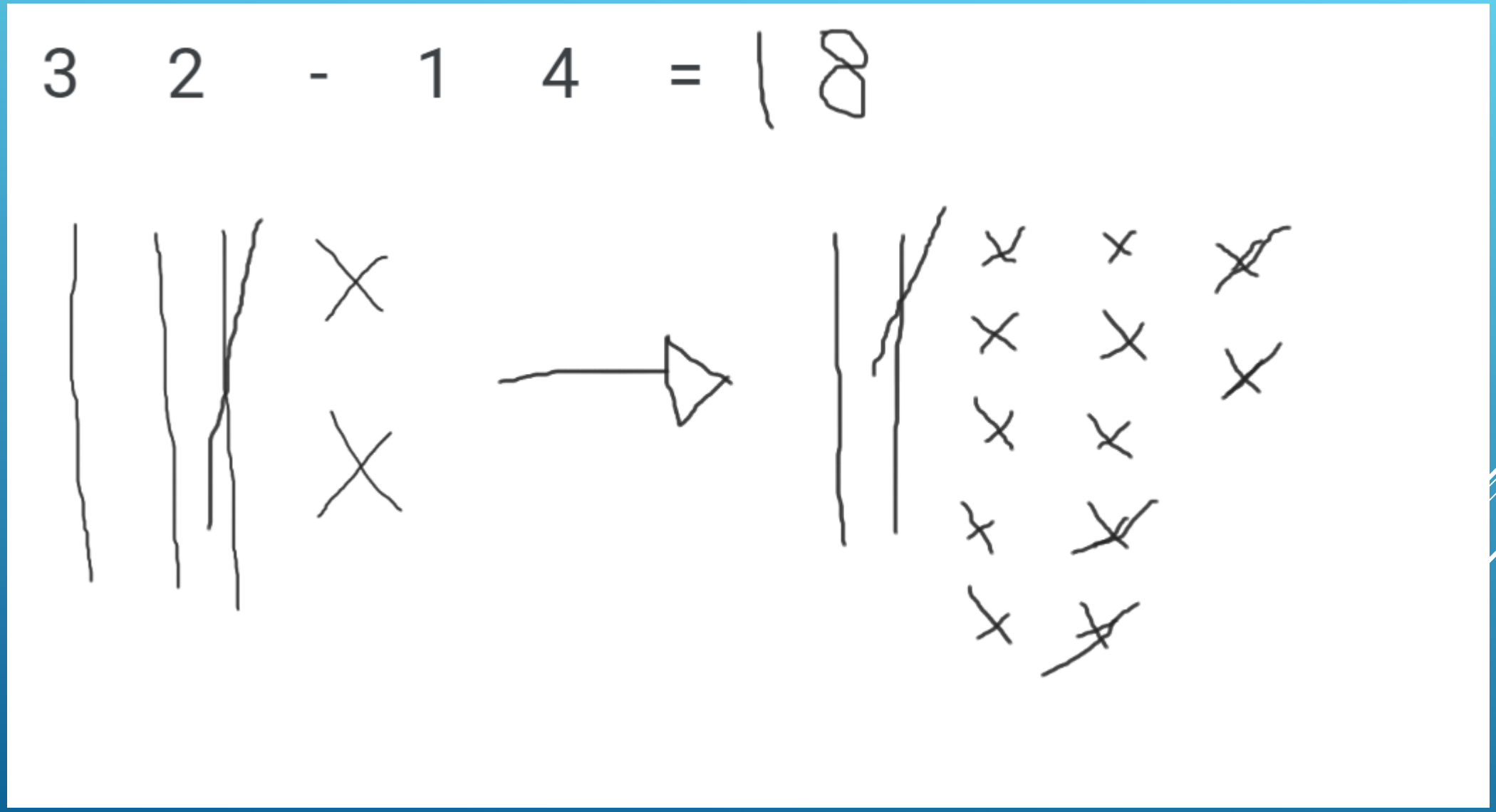
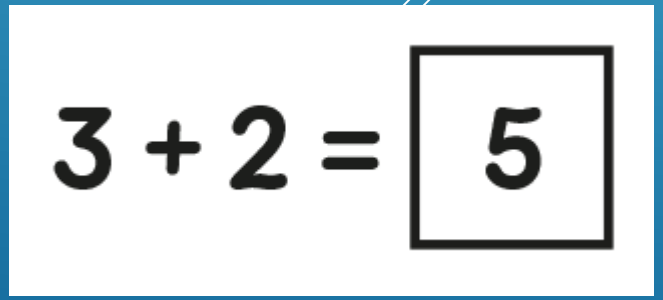


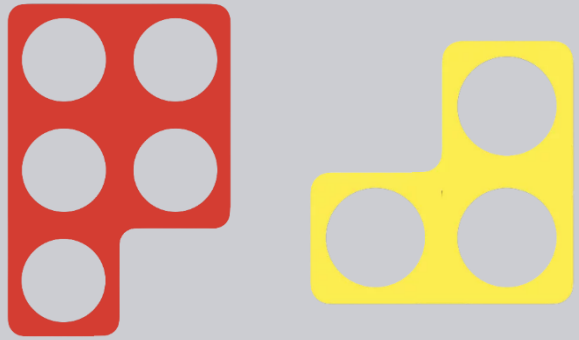
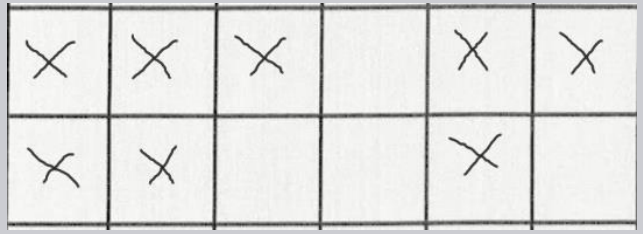
ABSTRACT

- The abstract stage involves the introduction of abstract concepts such as the written representation of number and mathematical symbols.
- It is important that children have a secure understanding of the concrete and pictorial stages before being introduced to this stage.
- This way misconceptions are easier to pick up on and address.



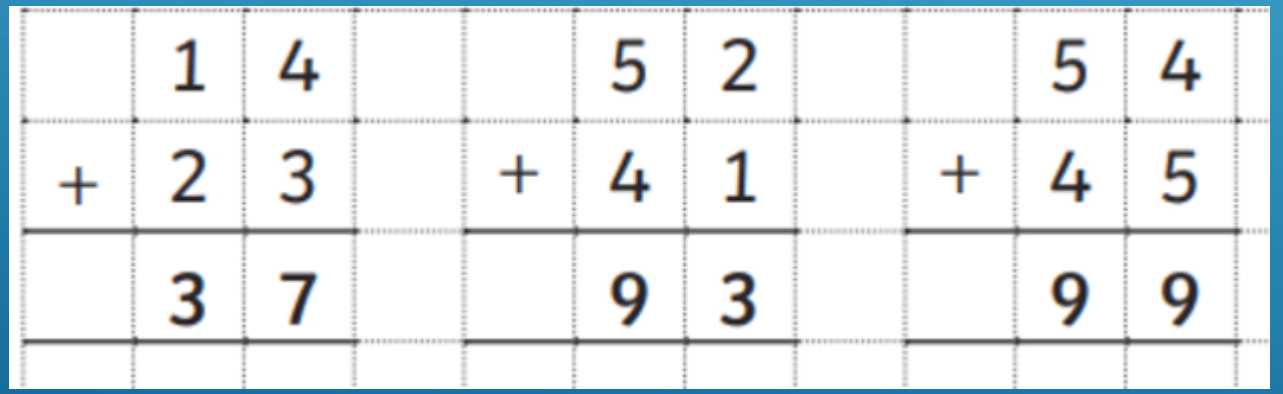
ABSTRACT

- At Days Lane we look at the concrete, pictorial and abstract representations alongside one another to solidify children's understanding.
- In KS1 the abstract stage of addition and subtraction consists of children reading and writing addition and subtraction equations and understanding their meaning.
- It also involves beginning to solve addition and subtraction equations mentally.

Concrete	Pictorial	Abstract
		5 + 3 = 8

ABSTRACT

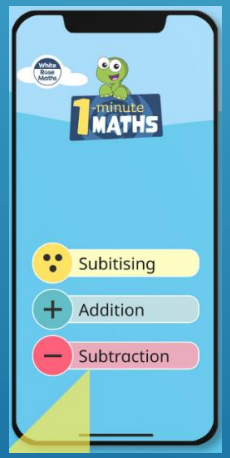
- The column method is another example of the abstract stage.
- This is something the children are introduced to in Year 3 when they have a deeper understanding of number and place value.



	1	4			5	2			5	4
+	2	3		+	4	1		+	4	5
	3	7			9	3			9	9

HOW CAN YOU HELP AT HOME?

- Encourage children to solve equations using concrete objects or by drawing pictorial representations. Ensure this is understood before moving onto the abstract.
- Numicon and base 10 are available to buy at several online retailers. Alternatively you can find online versions to use at home (see links below).
- If numicon or base 10 are not available you can use other objects around the house for the concrete stage of addition and subtraction (lego blocks, counters, etc).
- Once children understand the concrete and pictorial representations of equations you may wish to practice solving addition and subtraction mentally through the use of number bonds and related known facts.
- White Rose – 1 minute maths app.



Numicon- Online Resource

https://mathsbot.com/manipulatives/numberFrames

Base 10 – Online Resource

https://mathsbot.com/manipulatives/blocks

ANY QUESTIONS?