Calculation Strategies at West Cliff

Calculation Strategies

- "The Four Operations" – addition, subtraction, division and multiplication

- A progressive approach across the school.

- Children are expected to apply their understanding of the strategies to a range of problems (word, money etc.)

- Children will move through the strategies based on their own skill, not the year group they are in.

Place Value

- In order to add, subtract, divide and multiply, children need to understand what each digit/number represents. This is called 'place value'

Addition +

We may also say…

Altogether, Add, Combine,
Sum, Plus, Put with

Addition +

- Adding using concrete objects (counters, cubes, fingers)
- Number sticks and Number lines
- Partitioning (breaking a number up - using place value)
- Column addition ("How we did it!")

Concrete objects

Adding single digits together may be completed by using 'concrete/real' objects.

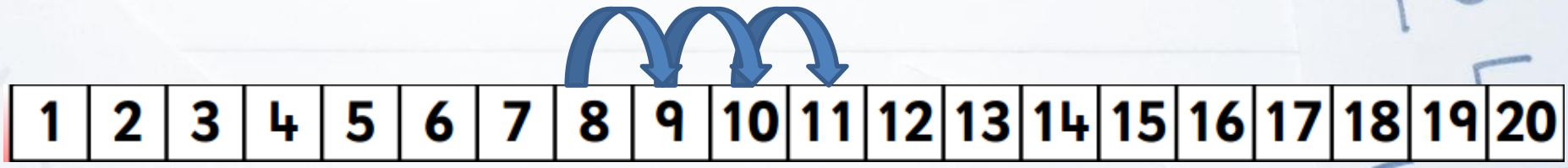
$$2 + 5 =$$

To solve this you could use any objects at home (counters, cubes... even your fingers!)

Number stick

A Number stick gives children an opportunity to visualise the order of numbers and begin to 'count on' - something that is explored further using a number line a little later on.

$$8 + 3 =$$

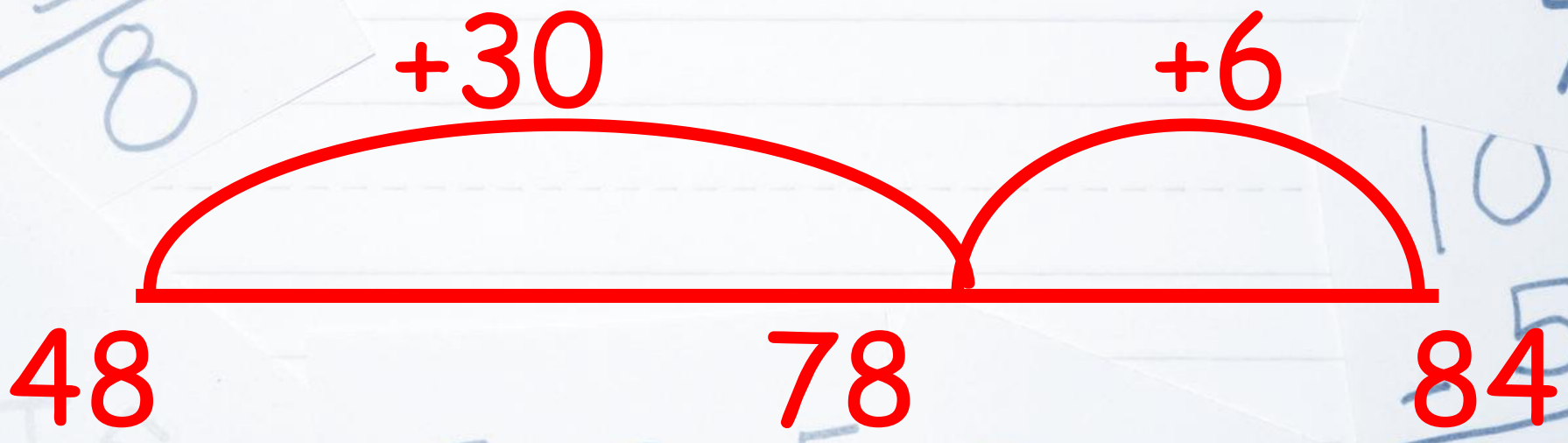


At home, your number stick could be a ruler.

Number line

A number line asks children to "jump up" to show their calculations.

48 + 36 =



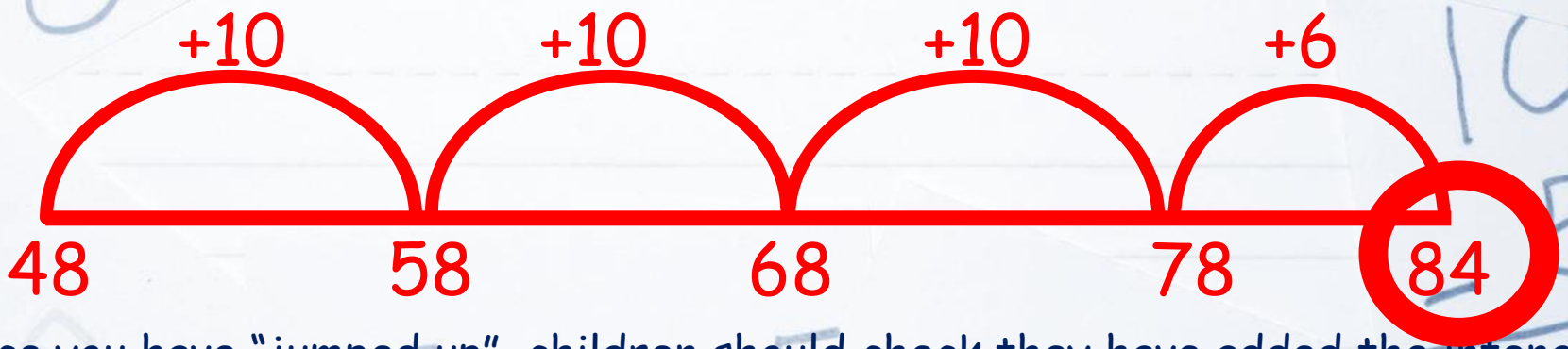
How to use the number line…

48 + 36

First draw your number line, with the first number from your sum on the left hand side of the line.

48

You will now "jump up" the second number from your sum (in our example, 36) Breaking this number down into simpler chunks makes adding up easier. This means that rather than one jump of 36, children may choose to jump 30 and 6 or 10, 10, 10 and 6.



Once you have "jumped up", children should check they have added the intended number. To find the answer of the sum, children will now record the number that they have "jumped up" to.

Partitioning

When partitioning, it is important that children can grasp the concept of place value and recognise what each digit shown actually represents.

When we partition, we break our numbers up so that we are only adding numbers with the same value (e.g. just adding the units, then only the tens etc.)

For example...

56 + 12 =

When partitioned becomes...

50 + 10 = 60

6 + 2 = 8

60 + 8 =

Your turn…

78 + 45 =

(Number line)

434 + 221 =

(Partitioning)

Column Method

This is the way I was taught!

Column method looks at adding vertically and 'carrying over'. It is important to discuss with children what they are carrying (place value, again!)

$$\begin{array}{r} 48 \\ +\ 36 \\ \hline 84 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 143 \\ +\ 89 \\ \hline 232 \\ \hline 1\ 1 \end{array}$$

Subtraction -

We may also say…

Take away, Minus, Difference
Less than, Subtract

Subtraction -

- Subtracting using concrete objects (counters, cubes, fingers)
- Number sticks and Number lines
- Column subtraction ("How we did it!")

Concrete objects

Subtracting single digits together may be completed by using 'concrete/real' objects.

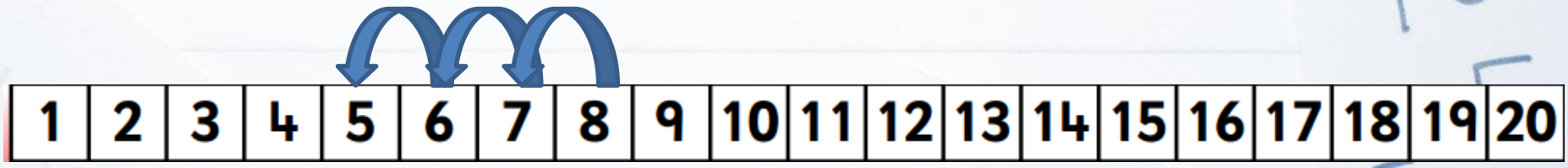
$$5 - 3 =$$

To solve this you could use any objects at home (counters, cubes... even your fingers!)

Number stick

As with addition, children can use a number stick to visualise numbers in relation to each other. Children can use the stick to count backwards when subtracting.

8 - 3 =

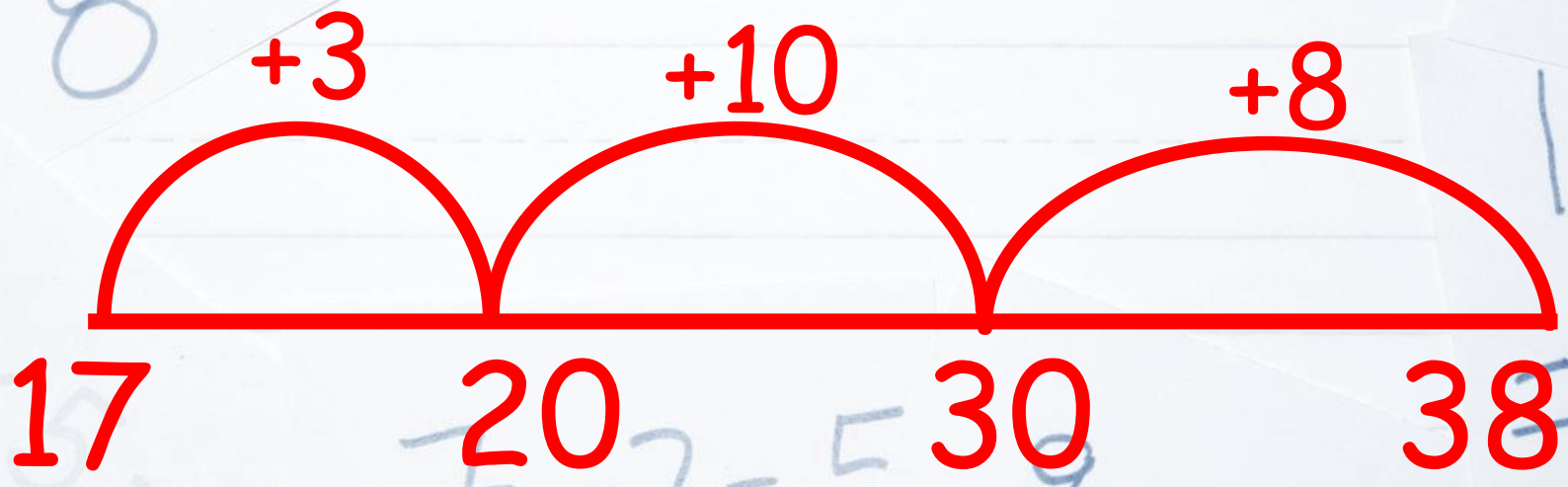


At home, your number stick could be a ruler.

Number line

When subtracting using a number line, children will count up from the lowest number of the sum up to the highest. Children will reach their answer by then adding up the jumps they have made – this is the **difference** between the two numbers.

38 - 17 =

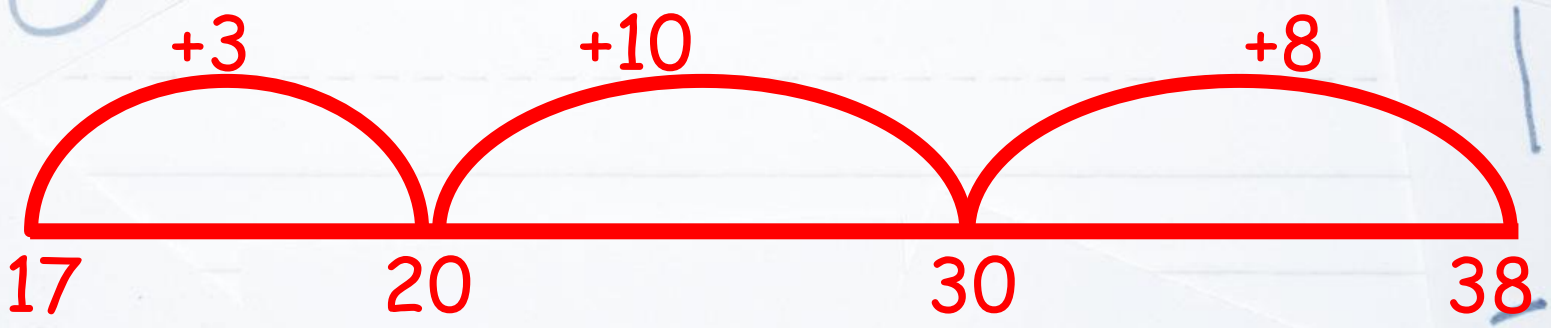


How to use the number line…

38 - 17

First draw your number line, with the smallest number on the left hand side of the line and the largest number on the right. You will then "jump" to find the difference.

Begin by jumping to reach "easy" numbers (those that end in a zero) Begin by jumping to the nearest ten, then hundred, then thousand and so on…



Once they have "jumped up", children should check over their work. They will then add all of their jumps together. This shows the difference between the two numbers and is therefore the answer to the problem.

Column Method

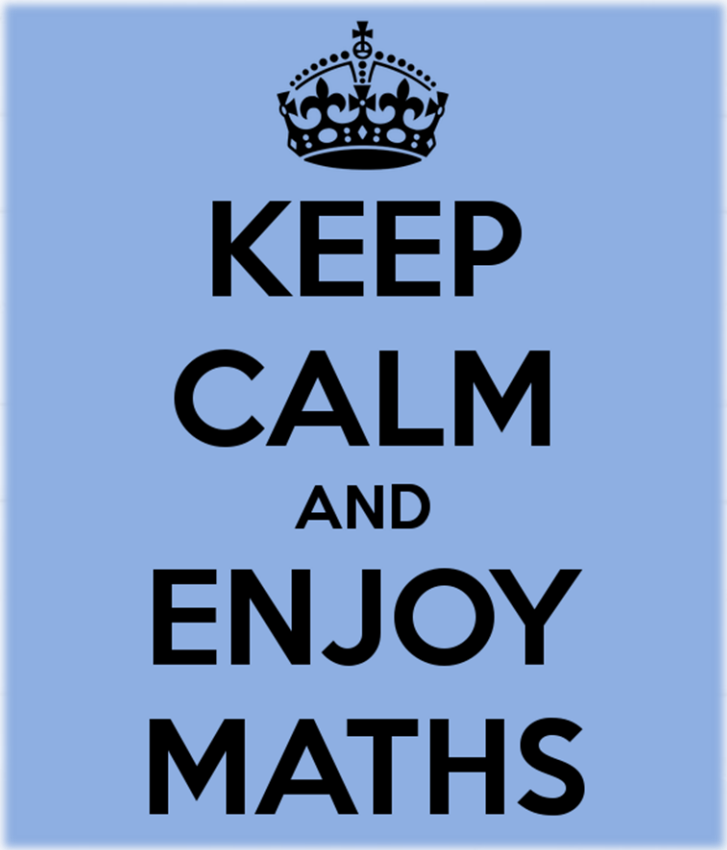
This is the way I was taught!

Column method looks at subtracting vertically and 'borrowing'. It is important to discuss with children what they are borrowing (place value, again!)

$$\begin{array}{r} 48 \\ -\,36 \\ \hline 12 \end{array}$$

$$\begin{array}{r} {}^{3}\not{4}\,{}^{1}3 \\ -\,229 \\ \hline 114 \end{array}$$

Time to have a go…



Multiplication x

We may also say…

Multiply, Times, Product,
Groups of, Lots of

Learn your times tables!!

Multiplication x

- Repeated addition / "Lots of…"
- Grid method

Repeated Addition / How many "lots of…?"

$5 \times 3 =$

Repeated addition:

$5 \times 3 =$

$5 + 5 + 5$

How many in…

three lots of five?

This simple view of multiplication may be used for some children to introduce them to this operation.

Grid Method

Once again, the grid method relies on children understanding place value. The grid partitions numbers to allow children to multiply smaller chunks of a problem.

x	20	3
10	200	30
2	40	6

200
40
30
+6
276

23 x 12 = 276

How to use the grid method

Solving ... 23 x 12 =

1. Begin by drawing a grid with your multiplication symbol in the top right corner.
2. Next, look at the number of digits in figures you have. You then need to draw the same number of rows/columns (e.g. a two digit number needs two columns)
3. Now partition your numbers, breaking them up and displaying them on your grid (e.g. 23 becomes 20 and 3)

x	20	3
10	200	30
2	40	6

4. Now multiply your numbers. Your answers should go in the space where your two numbers meet (for example, read across from 2 and down from 3. The space you meet in will show the answer to 2 x 3

200
40
30
+6
276

5. Now add all of your answers together. You're done!

23 x 12 = 276

Your turn…

$32 \times 45 =$

$21 \times 34 =$

$434 \times 221 =$

Division ÷

We may also say…

Divisible by, Divide,
Shared between, Groups

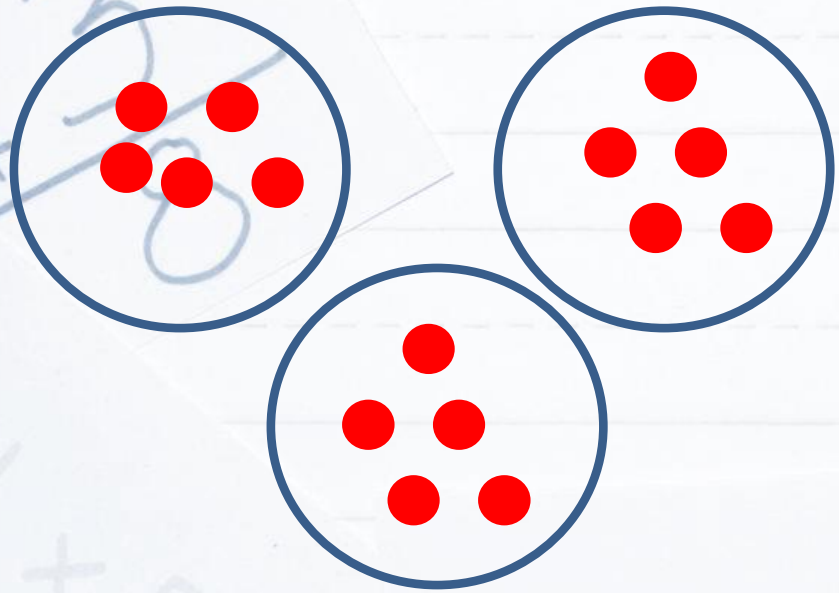
Division ÷

- Sharing / Grouping
- Number line
- "Bus Stop"

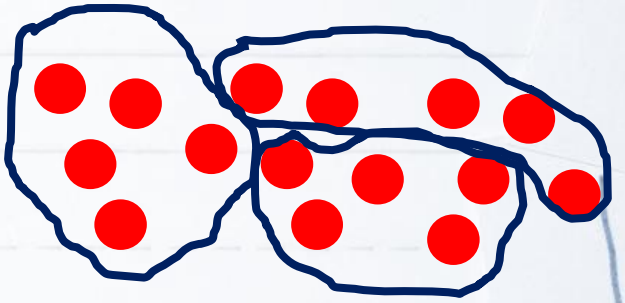
Sharing and Grouping

$$15 \div 3 =$$

Share 15 between 3:



Group 15 into 3 groups…

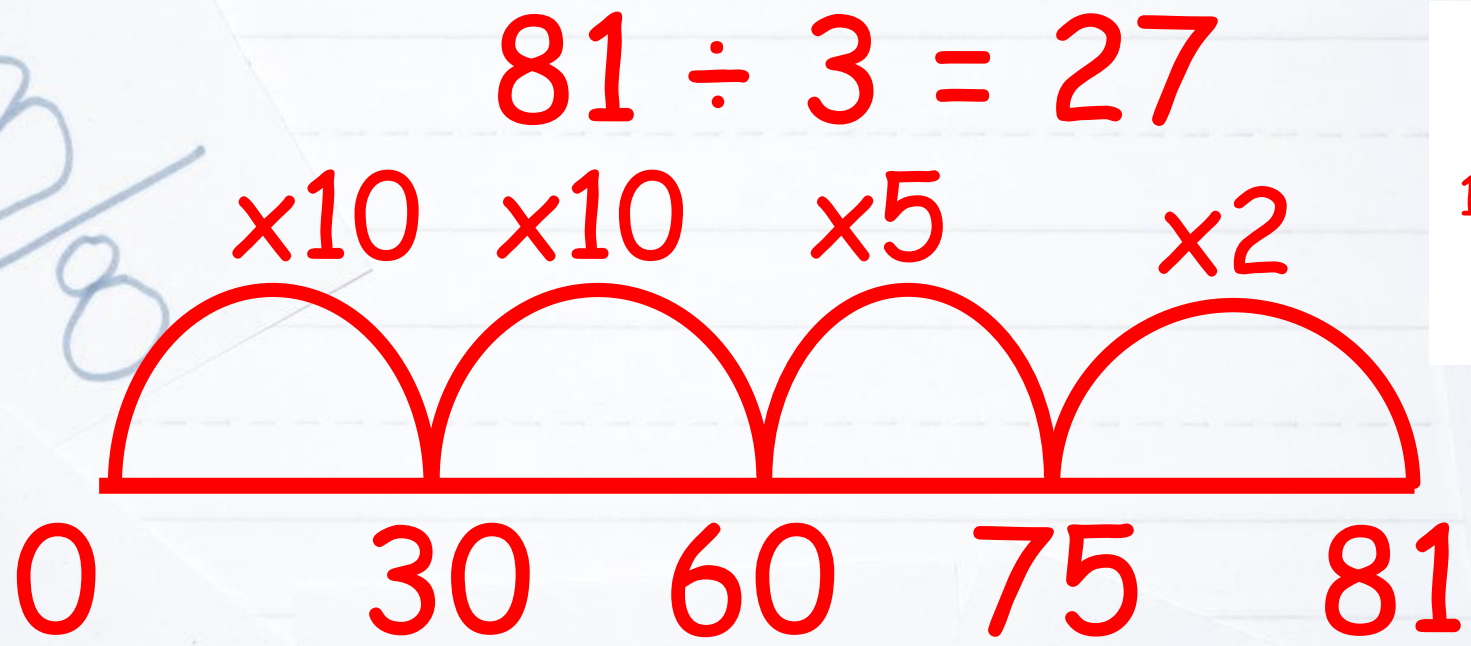


This simple view of division may be used for some children to introduce them to this operation.

Number line

When dividing on a number line, children are working out how many of one number goes into another (with 81÷3, how many 3s are in 81) Rather than counting each, individual 3 in 81, a number line helps us to count groups of 3s. Your total number of groups shows how many 3s there will be in 81.

$$81 \div 3 = 27$$



KFC

1 x 3 = 3

10 x 3 = 30

5 x 3 = 15

Using a number line 81 ÷ 3 = 27

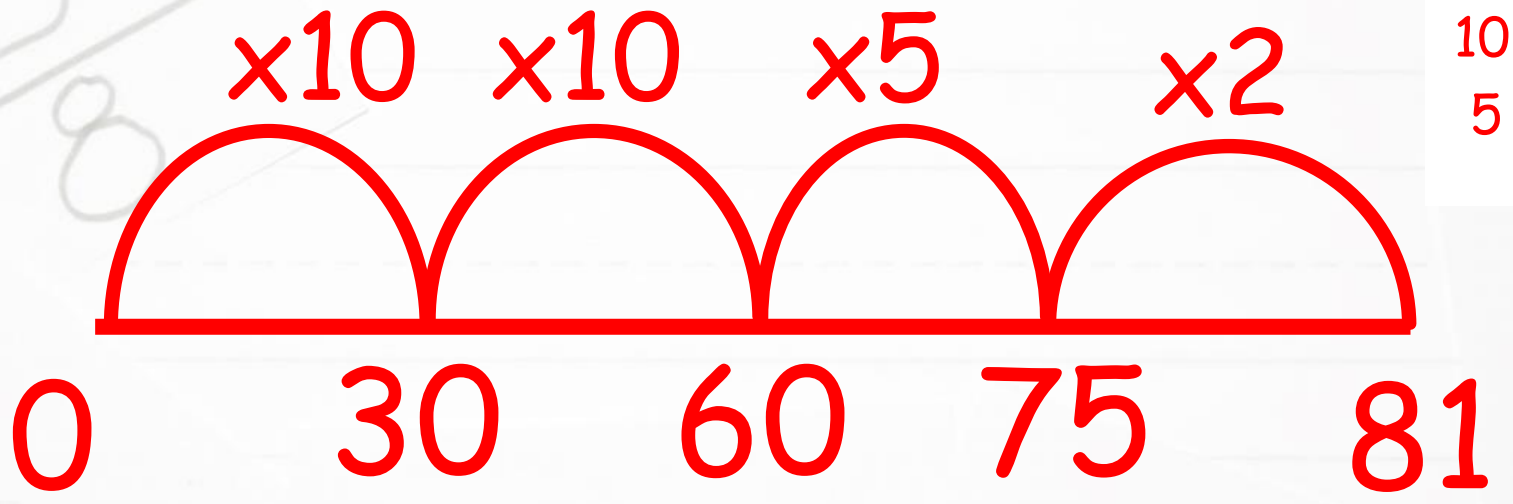
1. Always draw out your number line with 0 on the left and the first number of your problem (81) at the right hand side. You will be jumping from 0 to 81.
2. Now record your known facts (**KFC**) These will be about the number you are dividing by and will help you when solving your problem later. Begin by finding x10, x1 and x5. There may be other useful facts you could also record.
3. Using your known facts, begin the "jumping". We start by jumping up 30. This is recorded on the number line. The jump will then be shown by writing x 10. This means 10 jumps. We do this rather than 10 small jumps of 3.

KFC

1 x 3 = 3

10 x 3 = 30

5 x 3 = 15

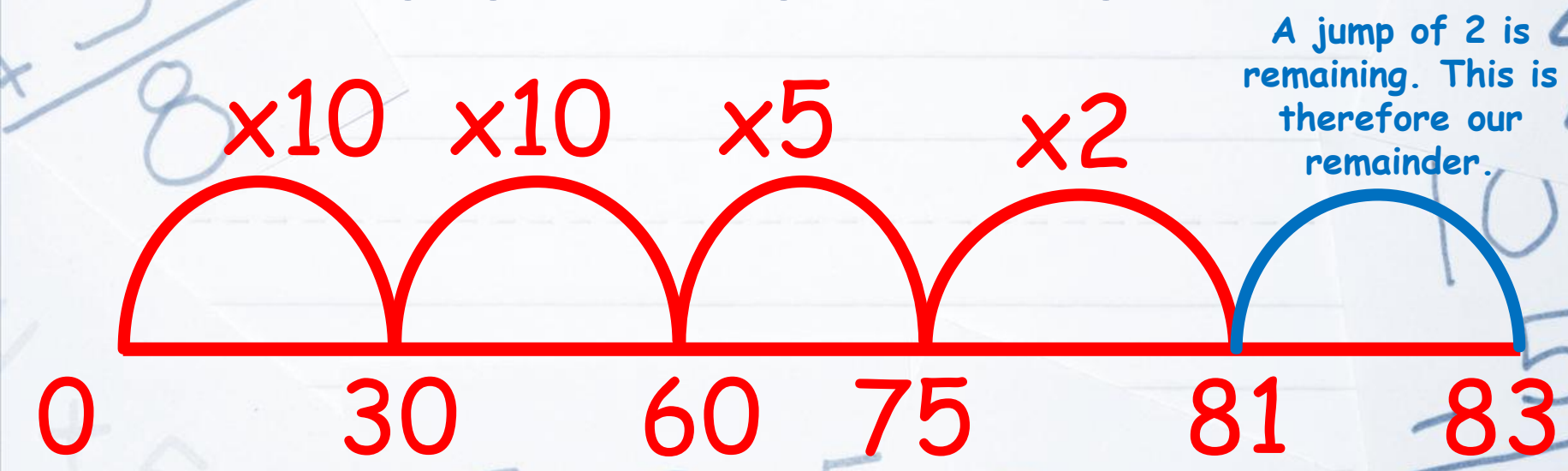


4. We continue our jumps in the same way as described. We continue, using our known facts, until we reach our target number.
5. The answer to the problem is found by adding the total number you've jumped. In this case we add 10 + 10 + 5 + 2 to find our answer of 27.

But, what about if we have a remainder?

Remainders are nothing to panic about. We would do exactly the same as what has previously been described until we get as close as possible to our target number. We do not go over it.

Imagine we were solving 83 ÷ 3. We would do the same process from the previous slide and hopefully reach 81. If I was to jump another 3 I would be going too far and go over the target of 83.



So… 83 ÷ 3 = 27 r 2

The 'Bus Stop' method

This method is the traditional style (probably the one we were all taught at school!) Using the bus stop, we see how many of one number goes into another.

$$\begin{array}{r} 036 \\ 7\overline{)2^{2}5^{4}2} \end{array}$$

We work through our number (252) to see how many 7s go into each digit

How to do the bus stop

We begin by drawing our bus shelter with our largest number (252) underneath it. The smallest number goes on the outside (7)
Now work through the large number to see how many 7s go into each digit.

How many 7s are in 2?

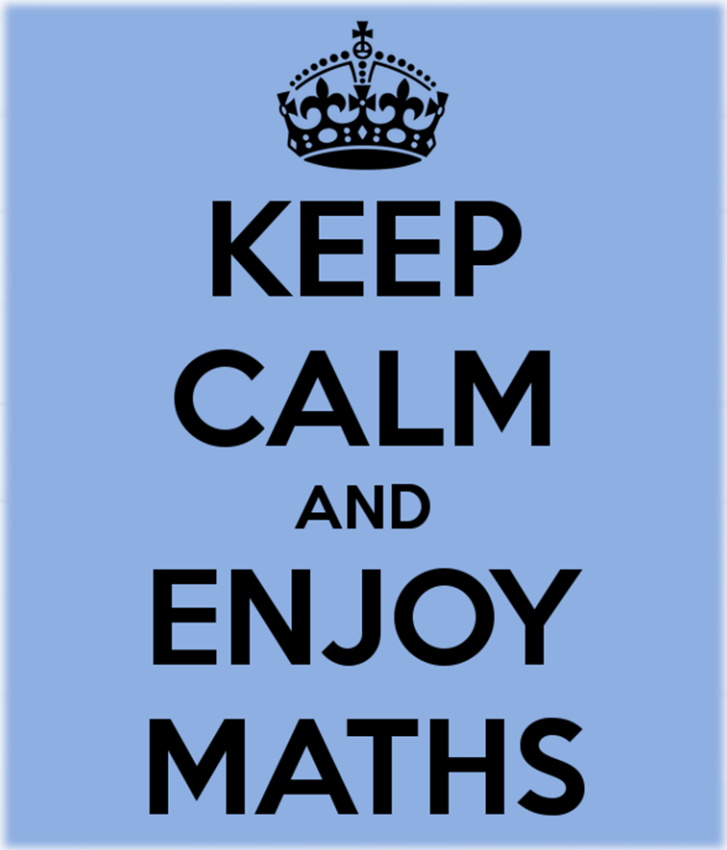
$$7\overline{)252}$$

$$\begin{array}{r} 036 \\ 7\overline{)252} \end{array}$$

As there are 0 7s in 2, carry the 2 over to make the question, How many 7s in 25?

Continue through this process.

Time to have a go…



How have we done?

- To make everyone aware of the methods used for addition, subtraction, multiplication and division in school.
- To offer/discuss a range of ways to help your child at home.
- Identify any other areas we can support you further in.

Thank You!

If you are still unsure, please come and speak to your child's class teacher who will be more than happy to help!