

Ocklynge Junior School

**Whole School Written
Calculations Policy**

Parental guide

The children will have been taught mental methods from their Foundation Stage at infant school. They will also have learnt to use jottings to support them with calculations. At Ocklynge we will continue to build on these methods, but by the time children reach Year 3, the numbers they are working with are often less manageable mentally or with jottings, so they need written methods.

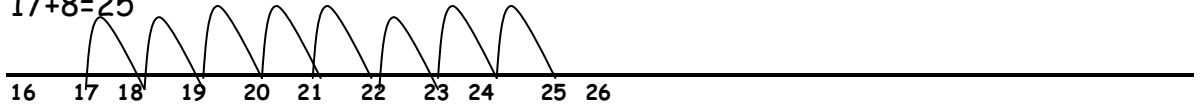
The stages of progression in each of the four operations are not Year Group specific. Our aim at Ocklynge is that each child is able to carry out accurately the most efficient and suitable method for completing their work. To succeed does not mean that the final stages have to be their chosen method.

It is the policy in Ocklynge school to write H T U for number calculations.

Stages in Addition

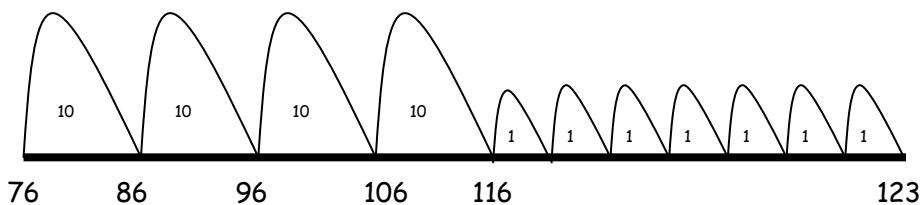
1. Using a number line with numbers. Start with the largest number and count on in steps of 1 or 10.

$$\begin{array}{r} \text{TU} \quad \text{U} \quad \text{TU} \\ 17 + 8 = 25 \end{array}$$



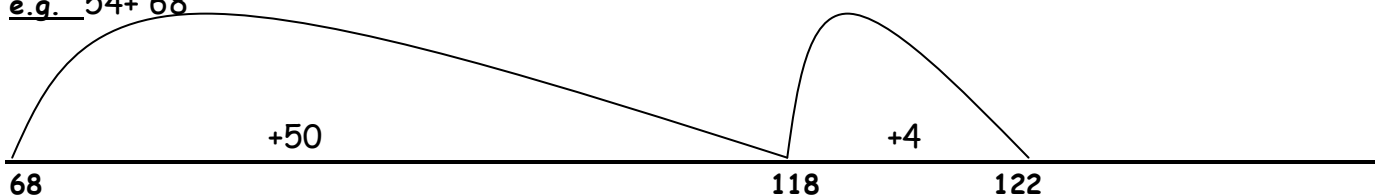
This leads onto using a blank number line. Start with the largest number and add on the smaller number

$$\begin{array}{r} \text{TU} \quad \text{TU} \quad \text{HTU} \\ 47 + 76 = 123 \end{array}$$



From counting on every 10 and every unit, use jumps which are multiples of 10 and not doing an individual jump for each unit.

e.g. $54 + 68$



2. Partitioning method (horizontal layout)

$$\begin{array}{r} \text{TU} \quad \text{TU} \\ 73 + 56 = (70 + 50) + (3 + 6) \\ = 120 + 9 \\ = 129 \end{array}$$

Partitioning method (vertical layout)

$$\begin{array}{r} \text{TU} \quad \text{TU} \\ 73 + 56 \quad 70 + 50 = 120 \\ \quad \quad \quad 3 + 6 = \underline{9} \\ \quad \quad \quad \underline{129} \end{array}$$

3. Vertical layout with expanded working, adding the most significant digit first

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{U} \\ \quad \quad 5 \quad 8 \quad + \\ \quad \quad 7 \quad 4 \\ \hline 1 \quad 2 \quad 0 \\ \quad \quad 1 \quad 2 \quad + \\ \hline 1 \quad 3 \quad 2 \end{array}$$

1. Vertical layout with expanded working, adding the least significant digit first

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{U} \\ \quad \quad 5 \quad 8 \quad + \\ \quad \quad 7 \quad 4 \\ \hline \quad \quad 1 \quad 2 \\ 1 \quad 2 \quad 0 \quad + \\ \hline 1 \quad 3 \quad 2 \end{array}$$

2. Vertical layout, contracting the working to a compact and efficient form

$$\begin{array}{r} \text{H} \quad \text{T} \quad \text{U} \\ \quad \quad 5 \quad 8 \quad + \\ \quad \quad 7 \quad 4 \\ \hline 1 \quad 3 \quad 2 \\ \hline 1 \quad 1 \end{array}$$

Stages in subtraction

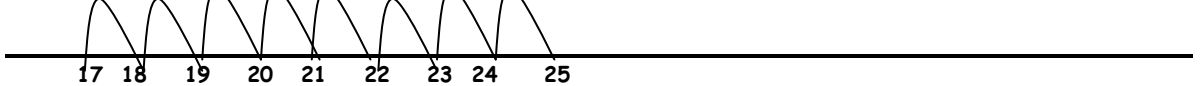
Using a number line with numbers.

Find the **difference** between 2 numbers by counting on.

Subtract a number by counting back.

T U U

$$25 - 8$$

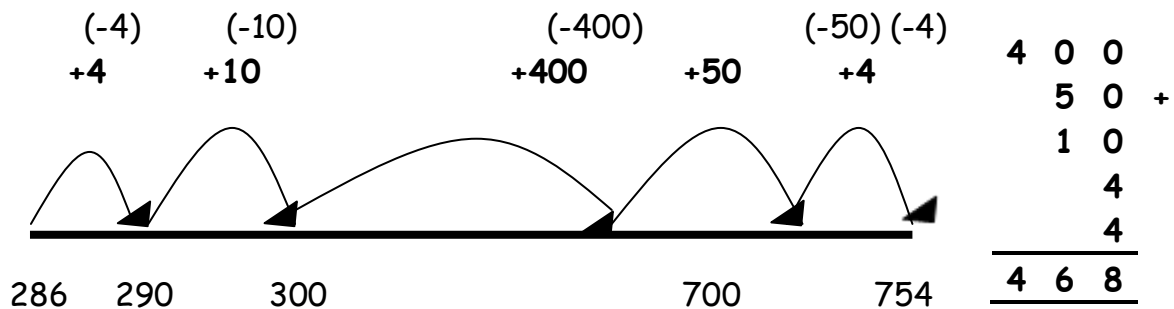


Using a blank number line

To find the **difference** between 2 numbers, count up from the smaller to the larger number (complementary addition)

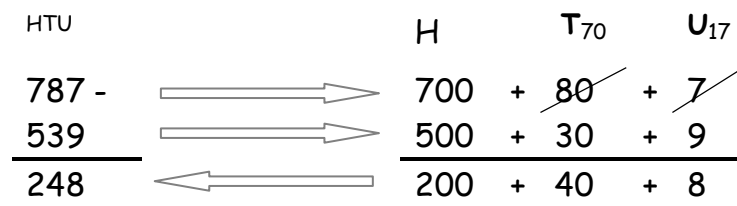
To **subtract** a number, count back from the larger to the smaller number.

$$754 - 286$$



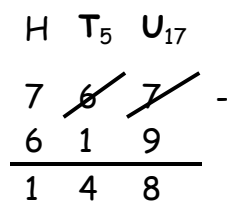
Vertical layout - expanded method

$$787 - 539$$



Vertical layout - compact method

$$767 - 619$$



Progression in Multiplication

1. Arrays

Pupils show multiplications using arrays of dots/x's

Eg: $4 \times 3 = 12$

```

x x x x
x x x x
x x x x
    
```

2. Number line

Pupils use a number line, showing appropriate 'jumps', (starting with a numbered line, progressing to blank number line).

eg: $4 \times 3 = 12$



3. Grid Method (T U x U)

$23 \times 8 = 184$

	T	U
x	20	3
8	160	24

When adding these numbers allow the children to use a method they are confident in using.

H	T	U	
1	6	0	+
	2	4	
		4	
	8	0	
1	0	0	
1	8	4	

Grid Method (T U x T U)

$72 \times 38 = 2736$

	70	2
x	30	6
8	560	16

TH	H	T	U	
2	1	0	0	
	5	6	0	+
		6	0	
		1	6	
			6	
	1	3	0	
	6	0	0	
2	0	0	0	
2	7	3	6	

4 Partitioning hundreds, tens and units (no grid)

Eg 234×3

Step 1:

$$(200 \times 3) + (30 \times 3) + (4 \times 3)$$

$$600 + 90 + 12 = 702$$

Step 2: 234×3

$$\begin{array}{r} 2 \ 3 \ 4 \\ \quad \quad 3 \ x \\ \hline \quad 1 \ 2 \quad (4 \times 3) \\ \quad 9 \ 0 \quad (30 \times 3) \\ 6 \ 0 \ 0 \quad (200 \times 3) \\ \hline 7 \ 0 \ 2 \\ \hline 1 \end{array}$$

64×29

$$\begin{array}{r} 6 \ 4 \\ \quad 2 \ 9 \ x \\ \hline \quad 3 \ 6 \quad (4 \times 9) \\ 5 \ 4 \ 0 \quad (60 \times 9) \\ \quad 8 \ 0 \quad (4 \times 20) \\ 1 \ 2 \ 0 \ 0 \quad (60 \times 20) \\ \hline 1 \ 8 \ 5 \ 6 \\ \hline 1 \end{array}$$

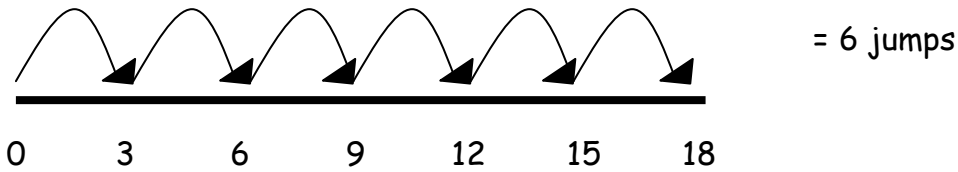
3. Compact method

$$\begin{array}{r} 8 \ 3 \\ \quad 4 \ 7 \ x \\ \hline 5 \ 8_2 \ 1 \quad (83 \times 7) \\ 3 \ 3_1 \ 2 \ 0 \quad (83 \times 40) \\ \hline 3 \ 9 \ 0 \ 1 \\ \hline 1 \end{array}$$

Progression in Division

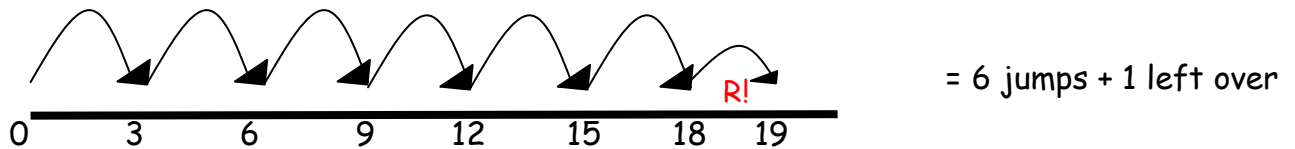
1. Using a number line

$18 \div 3 = 6$ (Sharing \rightarrow 18 shared between 3 *or* Grouping \rightarrow How many groups of 3 make 18?)



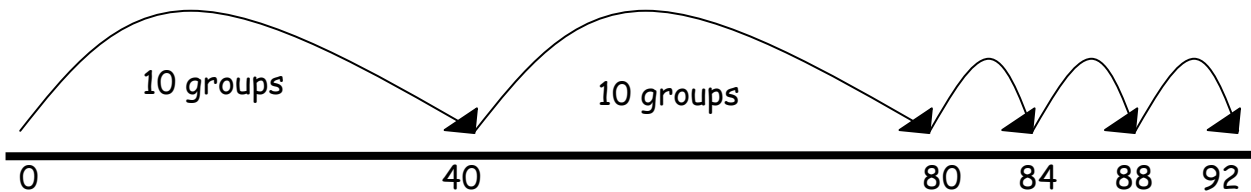
2. Using a number line with remainders

$19 \div 3 = 6 \text{ r}1$



3. Using a number line with bigger jumps

$92 \div 4 = 23$



4. Chunking (T U \div U)

$96 \div 6 = 16$

$$\begin{array}{r} 6 \overline{) 96} \\ - 60 \quad 10 \text{ groups} \\ \hline 36 \\ - 36 \quad 6 \text{ groups} \\ \hline 0 \\ \hline = 16 \end{array}$$

5. Chunking (H T U ÷ U with remainder)

$$196 \div 6 = 32 \text{ r}4$$

$$\begin{array}{r} 6 \overline{)196} \\ - 180 \quad 30 \text{ groups} \\ \hline 16 \\ - 12 \quad 2 \text{ groups} \\ \hline 4 \\ \hline \end{array} = 32 \text{ r}4$$

6. Chunking (H T U ÷ T U)

$$972 \div 36 = 27 \text{ r}1$$

$$\begin{array}{r} 36 \overline{)973} \\ - 720 \quad 20 \text{ groups} \\ \hline 253 \\ - 252 \quad 7 \text{ groups} \\ \hline 1 \\ \hline \end{array} = 27 \text{ r}1$$

7. Short Division

$$583 \div 3 = 194 \text{ r}1$$

$$\begin{array}{r} 194 \text{ r}1 \\ 3 \overline{)583} \end{array}$$