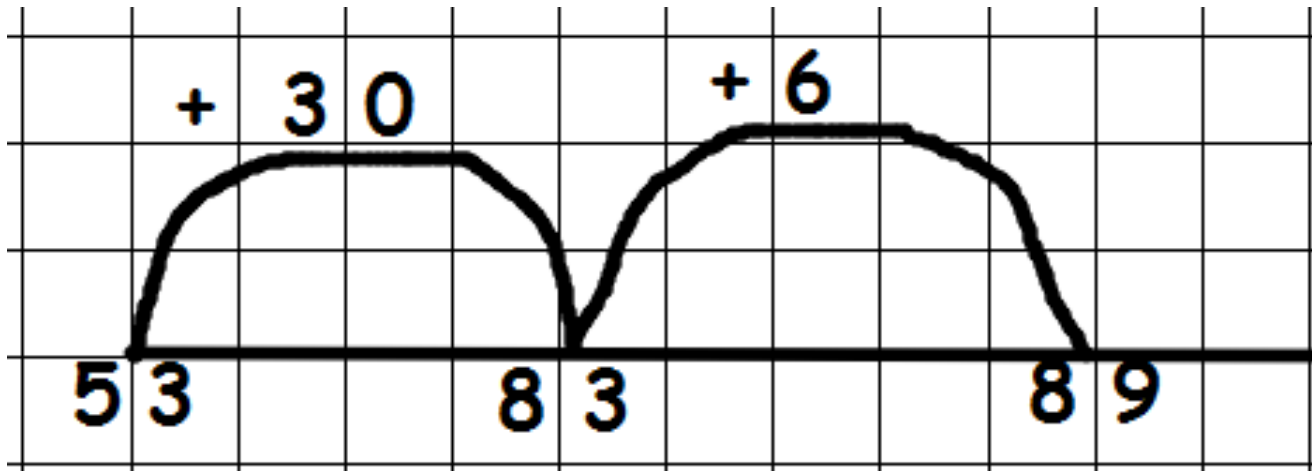


**Written methods for
calculation-
addition, subtraction,
multiplication and division**

Cleveland Road Primary School

WRITTEN METHODS FOR ADDITION: Year 3

$$53 + 36$$



Number line

Partition into tens and ones and recombine

Partition both
numbers
and recombine.

$$36 + 53$$

$$30 + 50 = 80$$

$$3 + 6 = 9$$

$$80 + 9 = 89$$

$$\begin{aligned} &30 + 6 + 50 + 3 \\ &= 30 + 50 + 3 + 6 \\ &= 80 + 9 = 89 \end{aligned}$$

Expanded column addition (carrying over)

$$67 + 85$$

	6	0	+	7
	8	0	+	5
1	4	0	+	12

$$140 + 10 + 2 = 152$$

Column addition

$$29 + 135$$

$$\begin{array}{r} \overset{1}{2}9 \\ +135 \\ \hline 164 \end{array}$$

Statutory requirements:

add and subtract numbers with up to **three digits**, using formal written methods of columnar addition and subtraction.

Expanded column addition (carrying over): Year 4

$$367 + 185 = 552$$

3	0	0	+	6	0	+	7		
1	0	0	+	8	0	+	5		
4	0	0	+	1	4	0	+	1	2

4	0	0	+	1	4	0	+	1	0	+	2	=	5	5	2
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Column addition (carrying over)

$$3587 + 675 = 4262$$

	1	1	1	
	3	5	8	7
	+	6	7	5
	4	2	6	2

Statutory requirements:

add and subtract numbers with **up to 4 digits** using the formal written methods of columnar addition and subtraction where appropriate

Column addition (carrying over): Year 5

$$\text{£}23.59 + \text{£}7.55 =$$
$$\text{£}31.14$$

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

$$23167 + 2598 = 25765$$

			1	1		
	2	3	1	6	7	
+		2	5	9	8	
	2	5	7	6	5	

Column addition (carrying over): Year 6

Extend to numbers with any number of digits and decimals with 1, 2 and/or 3 decimal places

$$81059 + 3668 + 15301 + 20551$$

		¹	¹	¹	¹	
	8	1	0	5	9	
		3	6	6	8	
	1	5	3	0	1	
+	2	0	5	5	1	
1	2	0	5	7	9	

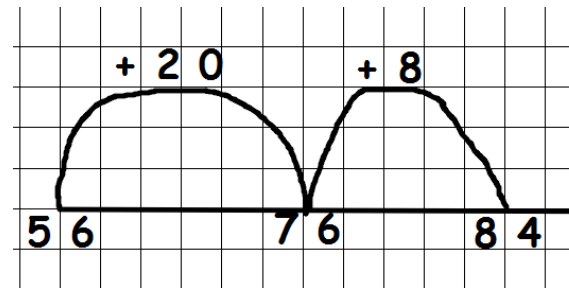
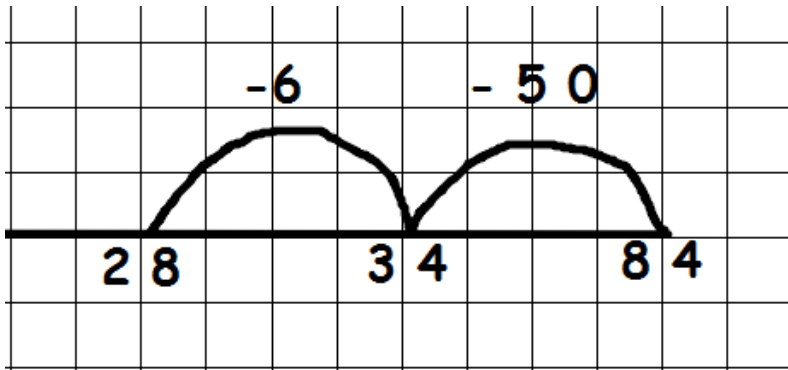
$$23.361 + 9.08 + 59.77 + 1.3$$

	²	¹	²		
	2	3	3	6	1
		9	0	8	
	5	9	7	7	
+	1	3			
9	3	5	1	1	

WRITTEN METHODS FOR SUBTRACTION : Year 3

The Empty Number Line for finding difference by counting back: counting back in tens and ones

$$84 - 56 = 28$$



Counting up

Partitioning: Use known number facts and place value to subtract

(partition the number to be subtracted only)

$$\begin{aligned} 77 - 12 &= 77 - 10 - 2 \\ &= 67 - 2 \\ &= 65 \end{aligned}$$

Expanded decomposition:

$$238 - 146 = 92$$

		2	3	8	-	1	4	6	=	9	2
		1	0	0		1					
		2	0	0	+	3	0	+	8		
		-	1	0	0	-	4	0	-	6	
							9	0	+	2	

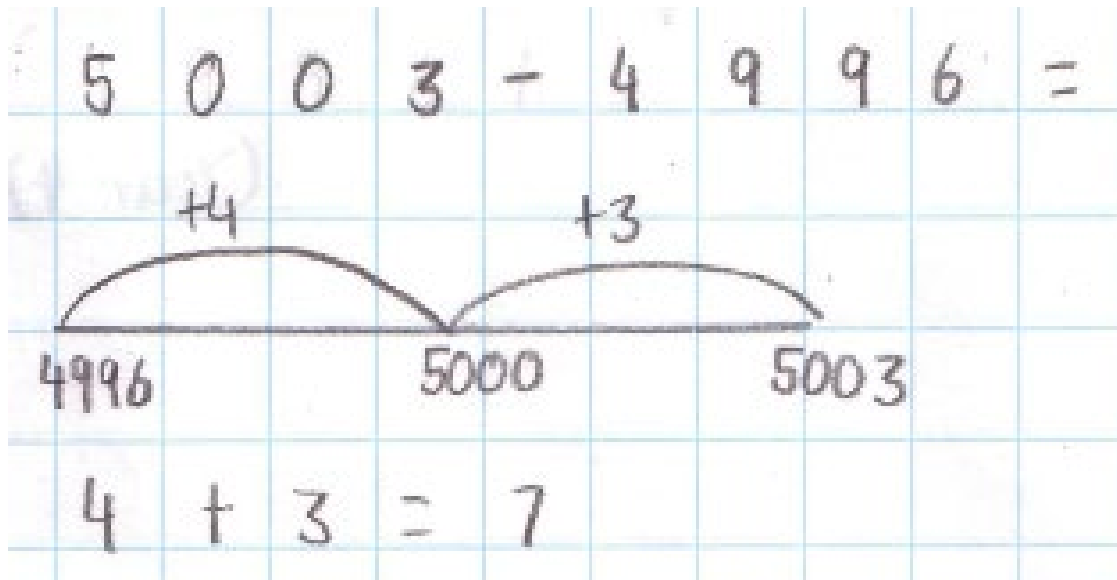
1	0	0			1						
2	0	0			3	0				8	
1	0	0			4	0				6	
					9	0				2	

Column method:

		2	3	8	-	1	4	9	=	8	9
		1	2	1							
		2	3	8							
		-	1	4	6						
			0	8	9						

Year 4

The Empty Number Line for finding difference by counting up: bridging through multiple of 10 or 100:



$$5003 - 4996 = 7$$

Partitioning: Use known number facts and place value
to subtract (partition the number to be subtracted only)

$$\begin{aligned} &277 - 192 \\ &= 277 - 100 - 90 - 2 \\ &= 177 - 90 - 2 \\ &= 87 - 2 \\ &= 85 \end{aligned}$$

$$\begin{aligned} &277 - 192 \\ &277 - 100 - 90 - 2 \\ &277 - 100 \\ &177 - 90 \\ &87 - 2 = 85 \end{aligned}$$

[illegible]

[illegible]

$$\begin{array}{r} 2754 \\ - 1562 \\ \hline 1192 \end{array}$$

Year 5 and 6

Column method:

	² 3	¹⁰ 1	¹⁰ 0	⁴ 5	⁶ 6
-		2	1	2	8
	2	8	9	2	8

		⁶ 7	¹⁰ 1	¹ 6	⁸ 9	¹ 0
	-		3	7	2	5
		6	7	9	6	5

	⁰ 1	¹⁴ 5	⁹ 10	⁶ 9	⁹ 9
-		8	9	9	4
	6	0	7	5	0

			⁹ 1	¹ 0	³ 5	¹ 4	¹ 1
	-		3	6	0	8	
			6	9		3	

Multiplication and Division



WRITTEN METHODS FOR MULTIPLICATION Year 3

Partitioning: 35×2

$$30 + 5$$

$$30 \times 2 = 60$$

$$5 \times 2 = 10$$

$$\underline{70}$$

$$\begin{array}{cc} & 3 & 5 \\ & \swarrow & \searrow \\ 30 \times 2 = 60 & & 5 \times 2 = 10 \\ & 60 + 10 = 70 & \end{array}$$

Grid method:

x	30	2
3	90	6

$$90 + 6 = 96$$

Short multiplication using formal written method:

		3	2	
	x		4	
	1	2	8	

Statutory requirements:

two-digit numbers times one-digit numbers,
mentally and progressing to formal written
methods

Grid method:

Year 4

	x		2	0		3
7	1	4	0	2	1	

$$23 \times 7$$

$$140 + 21 = 161$$

Expanded short multiplication

$$38 \times 7 = 266$$

3	8	
x		7
	5	6
2	1	0
2	6	6

$$\begin{array}{l} 8 \times 7 \\ 30 \times 7 \end{array}$$

Statutory requirements:

multiply two-digit and three-digit numbers by a one-digit number using formal written layout-

Short multiplication

		5	
	3	8	
x		7	
2	6	6	

Grid method: 72×38

	x		7	0		2	
3	0	2	1	0	0	6	0
	8		5	6	0	1	6

Year 5

$$2100 + 60 = 2160$$

$$560 + 16 = \underline{576}$$

$$2736$$

Start with short
multiplication:

	4	5		
	3	4	6	
	x		9	
3	1	1	4	

Long multiplication

				1	
				4	
				5	6
		x	2	7	
		1	3	9	2
		1	1	2	0
		1	5	1	2

Statutory requirements:

multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers

Short multiplication

Year 6

		2	3	4	
		4	3	4	6
x					8
3	4	7	6	8	

Long Multiplication:

	2	1			
	6	4			
	5	8	6		
	X	3	7		
1	4	1	0	2	
	1	7	5	8	0
	2	1	6	8	2

Statutory requirements:
multiply multi-digit numbers up to 4
digits by a two-digit whole number
using the formal written method of
long multiplication

WRITTEN METHODS FOR DIVISION : Year 3

Understand division as sharing and grouping:

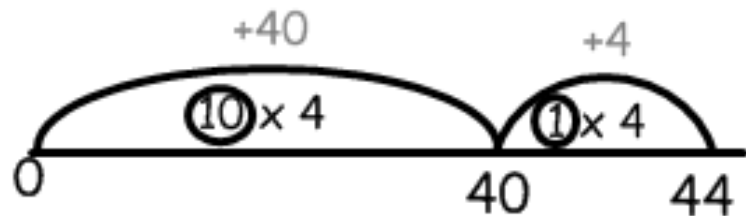
$18 \div 3$ can be modelled as:

Sharing : 18 shared between 3

Grouping : How many 3's make 18?



Grouping using a number line- forward jumps in multiples of the divisor



$$44 \div 4 = 11$$

Chunking method:

$$64 \div 4$$

$$\begin{array}{r} 64 \\ - 40 \quad (10 \times 4) \\ \hline 24 \\ - 24 \quad (6 \times 4) \\ \hline 00 \end{array}$$

Answer: 16

$$10 + 6 = 16$$

Year 4

And with remainders:

$$96 \div 7$$

$$\begin{array}{r} 96 \\ - 70 \quad (10 \times 7) \\ \hline 26 \\ - 21 \quad (3 \times 7) \\ \hline 5 \end{array}$$

Answer: 13 r. 5

Year 5

Chunking method:

$$256 \div 7 =$$

$$\begin{array}{r} 256 \\ - 210 \quad (7 \times 30) \\ \hline 46 \\ - 42 \quad (7 \times 6) \\ \hline 4 \end{array} \quad \begin{array}{l} \\ \\ 36 \text{ r } 4 \end{array}$$

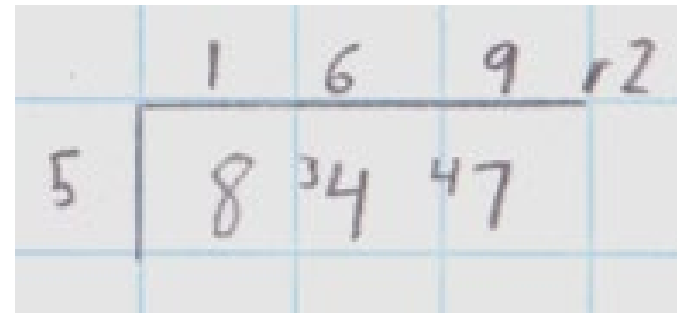
Short Division:

$$847 \div 5 =$$

$$169 \text{ r } 2$$

Statutory requirements:

divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context



Short division:

	1	6	9	r2
5	8	4	7	

Year 6

Statutory requirement:

divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

Long division:
 $5686 \div 12$

$$\begin{array}{r} 0473 \text{ r}10 \\ 12 \overline{) 5686} \\ \underline{48} \\ 88 \\ \underline{84} \\ 46 \\ \underline{36} \\ 10 \end{array}$$