Four Operations Knowledge Organiser

Key Vocabulary

- Add
- Total
- Make
- Plus
- Sum
- More
- Altogether
- Difference
- Leave
- Subtract
- Difference between
- Less
- Minus
- Take away
- Mentally, Orally
- Column Addition
- Column Subtraction
- Estimate
- Inverse operation
- Solve problems
- Number facts
- Place Value
- Complex

Add and Subtract Whole Numbers

Column Method

	4	5	8	6	4
+	2	3	4	9	7
	6	9	3	6	1
		1	1	1	

Starting with the ones, add each column in turn. Regroup tens, hundreds, thousands, ten thousands as required.

	3	5	$^6\!\!\not7$	$^{13}\!\!\not4$	$^1\!\not2$
-		3	4	7	6
	3	2	2	6	6

Starting with the ones, subtract each column in turn. Exchange tens, hundreds, thousands and/or ten thousands as required.

Multiply up to 4-digit by 2-digit

	1	$\not3$	$\not2$
		1	5	4
×		2	6
	9	2	4
3	0	8	0
4	0	0	4
1	1		

Start with the ones.

154 × 6 = 924

154 × 20 = 3080

3080 + 924 = 4004

Order of Operations

B	Brackets	10 × (4 + 2) = 10 × 6 = 60
O	Order	$5 + 2^2 = 5 + 4 = 9$
D	Division	10 + 6 ÷ 2 = 10 + 3 = 13
M	Multiplication	10 - 4 × 2 = 10 - 8 = 2
A	Addition	10 × 4 + 7 = 40 + 7 = 47
S	Subtraction	10 ÷ 2 - 3 = 5 - 3 = 2

Short Division

Start from the left.

12	$\,$	5	^{5}2	^{4}8	6	^{6}0
		4	4	0	5	

5 ÷ 12 = 0 r5
52 ÷ 12 = 4 r4
48 ÷ 12 = 4
6 ÷ 12 = 0 r6

Common Factors

Factors of 48

| 1 | 2 | 3 | 4 | 6 | 8 | 12 | 16 | 24 | 48 |

Factors of 30

| 1 | 2 | 3 | 5 | 6 | 10 | 15 | 30 |

Common factors: 1, 2, 3, 6

Common Multiples

Multiples of 3

| 3 | ... | 18 | 21 | 24 | ... | 39 | 42 |

Multiples of 7

| 7 | 14 | 21 | 28 | 35 | 42 |

Common multiples: 21, 42...

Long Division

		1	2	0	r	3
14	1	6	8	3		
	1	4	0	0		
		2	8	3		
		2	8	0		
				3		

Primes

A prime number has only 1 and itself as factors: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 33, 37, 41, 43

A composite number has factors other than 1 and itself.

Squares and Cubes

Square numbers result from a number being multiplied by itself (e.g. 5 × 5 = 25):

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

Cube numbers result from a number being multiplied by itself twice (2 × 2 × 2 = 8):

1, 8, 27, 64, 125

Mental Calculations and Estimation

Order of calculations:

50 × 34 × 2 = 50 × 2 × 34 = 100 × 34 = 3400

Money: £8.99 + £3.49 = £12.48

Use £9 + £3.50 = £12.50 and subtract 2p

Estimate on a number line

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   -8        0        8      16  20  24
   |_____|_____|_____|___|___|
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Subdivide line to estimate: **17**

Reason from Known Facts

90 ÷ 10 = 9   so 90 ÷ 20 = 4.5 and 90 ÷ 5 = 18

16 × 9 = 144   so 1.6 × 9 = 14.4

4352 ÷ 17 = 256

so 256 × 18 = 4352 + 256 = 4608

3786 + 2850 = 6636

so 4786 + 2850 = 7636

and 2786 + 3850 = 6636

and 8636 – 3786 = 4850