

Year 5 and 6 – Four Operations



Key Vocabulary

Add	Put together two or more numbers or amounts to calculate their total value.
Total	The whole number or amount of something.
Sum	The total amount resulting from the addition of two or more numbers, amounts or items.
Altogether	Including everything in total.
Difference (between)	A quantity by which amounts differ; the remainder left after subtraction of one value from another.
Subtract	Take away a number from another number so as to decrease the size, number or amount.
Minus	A mathematical operation of subtraction.
Take away	The process of subtracting an amount from another amount.
Mentally	To calculate the answer to a question using the mind rather than a written method.
Column addition	Addition by writing one number below the other and then adding one column at a time. Formal written method for addition.
Column Subtraction	Formal written method for subtraction. Writing one number below the other and then subtracting on column at a time.
Partition	Breaking up into parts; usually through each place value.
Estimate	To find a value that is close enough to the right answer, usually with some thought or calculation involved.
Inverse operation	An operation that undoes what was done by the previous operation. The inverse of addition is subtraction. The inverse of multiplication is division.

Order of Operations

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

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	13	12
-		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.

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Key Vocabulary

Number facts	Simple addition, subtraction, multiplication and division facts that children should recall instantly e.g. number bonds and times tables.
Product	An amount obtained by multiplying values together.
Array	A number arranged in rows or columns.
Remainder	The number which is left over in a division when one quantity does not exactly divide another
Multiply	To add groups of equal value together a set number of times e.g. $4 \times 3 = 4 + 4 + 4 = 12$
Divided	Split into equal parts to determine how many times a number contains another.
Factors	A number or quantity that when multiplied with another produces another number.
Multiples	A number that may be divided by another a certain number of times without a remainder.
Common factors	A factor of two or more numbers.
Common multiples	A multiple that is common to two or more numbers.
Prime Numbers	A number that is divisible by one and itself.
Square Numbers	The product of a number multiplied by itself.
Cubed Numbers	The product of a number multiplied by itself twice

Column addition

TTh	Th	H	T	O
4	8	2	4	7
3	3	6	8	1
8	1	9	2	8
1		1		

TTh	Th	H	T	O
10,000 10,000	1,000 1,000	100 100	10 10	1 1
10,000 10,000	1,000 1,000		10 10	1 1
	1,000 1,000			1 1
	1,000 1,000			1
10,000 10,000	1,000 1,000	100 100	10 10	1
10,000	1,000	100 100	10 10	
		100 100	10 10	
			10 10	
8	1	9	2	8
10,000		100		

Primes

A prime number has only 1 and itself as factors: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 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. $5 \times 5 = 25$):

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

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

1, 8, 27, 64, 125

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Common Factors

Factors of 48

1	2	3	4	6	8	12	16	24	48
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Factors of 30

1	2	3	5	6	10	15	30
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Common factors: 1, 2, 3, 6

Common Multiples

Multiples of 3

3	...	18	21	24	...	39	42
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Multiples of 7

7	14	21	28	35	42
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Common multiples: 21, 42...

Mental Calculations and Estimation

Order of calculations:

$$50 \times 34 \times 2 = 50 \times 2 \times 34 = 100 \times 34 = 3400$$

Money: $£8.99 + £3.49 = £12.48$

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

Estimate on a number line



Subdivide line to estimate: **17**

Reason from Known Facts

$90 \div 10 = 9$ so $90 \div 20 = 4.5$ and $90 \div 5 = 18$

$16 \times 9 = 144$ so $1.6 \times 9 = 14.4$

$4352 \div 17 = 256$

so $256 \times 18 = 4352 + 256 = 4608$

$3786 + 2850 = 6636$

so $4786 + 2850 = 7636$

and $2786 + 3850 = 6636$

and $8636 - 3786 = 4850$

Multiply up to 4-digit s by 2-digits

1,207 × 36

	TTh	Th	H	T	O
	1	2	0	7	
×			3	6	
	7	2	4	2	
+					

(1,207 × 6)

1,207 × 36

	TTh	Th	H	T	O
	1	2	0	7	
×			3	6	
	7	2	4	2	
+	3	6	2	1	0
	4	3	4	5	2
	1				

(1,207 × 6)
(1,207 × 30)

Short Division

Start from the left.

		4	4	0	·	5
12	5	2	8	6	0	

$5 \div 12 = 0 \text{ r}5$
 $52 \div 12 = 4 \text{ r}4$
 $48 \div 12 = 4$
 $6 \div 12 = 0 \text{ r}6$

Long Division

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