



# Year 6 Four Operations

# MATHS KNOWLEDGE ORGANISER



## ESSENTIAL VOCABULARY

<b>Factor</b>	we use factor to mean a number that can be multiplied or divided to produce a given number
<b>Multiple</b>	a multiple is the product of any quantity and an integer
<b>Common factor</b>	is a whole number which is a factor of two or more numbers.
<b>Common multiple</b>	is an integer (a whole number) that two or more numbers can multiply into without a remainder
<b>prime number</b>	A number that only has one and itself as factors
<b>Square numbers</b>	Square number result from a number being multiplied by itself
<b>Cube numbers</b>	Cube numbers result from a number being multiplied by itself twice
<b>estimate</b>	estimation means having a rough calculation of the value, number, quantity, or extent of something
<b>Inverse operation</b>	Inverse operations are opposite operations. They are the operation that reverses the effect of another operation
<b>short division</b>	Short division is a formal written method of dividing numbers. It's often used when dividing numbers with up to four digits by a one-digit number.
<b>Long multiplication</b>	Long Multiplication is a special method for multiplying larger numbers.
<b>Sum</b>	the whole number or amount when two or more numbers or amounts have been added together.
<b>Composite</b>	When a number can be divided up exactly it is a Composite Number
<b>dividend</b>	a dividend is the amount that you want to divide up.
<b>divisor</b>	Divisor can also mean a number that divides an integer exactly (no remainder).

## 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	<del>7</del> <sup>13</sup>	<del>4</del> <sup>1</sup>	<del>2</del>
-		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	<del>3</del>	<del>2</del>	
	1	5	4
×		2	6
	9	2	4
3	0	8	0
4	0	0	4
1	1		

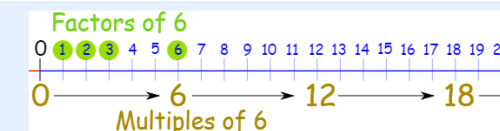
Start with the ones.

$154 \times 6 = 924$

$154 \times 20 = 3080$

$3080 + 924 = 4004$

## Factor, multiples



Factors:

- $1 \times 6 = 6$ , so **1** and **6** are factors of 6
- $2 \times 3 = 6$ , so **2** and **3** are factors of 6

Multiples:

- $0 \times 6 = 0$ , so **0** is a multiple of 6
- $1 \times 6 = 6$ , so **6** is a multiple of 6
- $2 \times 6 = 12$ , so **12** is a multiple of 6
- and so on

## LINKS TO PREVIOUS LEARNING

perform mental calculations, including with mixed operations and large numbers

identify common factors, common multiples and prime numbers

perform mental calculations, including with mixed operations and large numbers

## Stem sentences

To cube a number, we need to multiply the number by \_\_\_\_\_ and then by \_\_\_\_\_ again.

To multiply by a 2-digit number, we need to first multiply by the \_\_\_\_\_ and then find the \_\_\_\_\_.

The factor pairs of \_\_\_\_\_ are \_\_\_\_\_.

\_\_\_\_\_ is a common multiple of \_\_\_\_\_ and \_\_\_\_\_.



## Short Division

Start from the left.

		4	4	0	5	$5 \div 12 = 0 \text{ r}5$
12	5	<sup>5</sup> 2	<sup>4</sup> 8	<sup>6</sup> 0		$52 \div 12 = 4 \text{ r}4$
						$48 \div 12 = 4$
						$6 \div 12 = 0 \text{ r}6$

## Long Division

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

## 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

## 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.

## Mental Calculations and Estimation

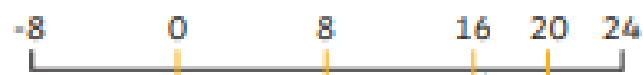
Order of calculations:

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

Money:  $\pounds 8.99 + \pounds 3.49 = \pounds 12.48$

Use  $\pounds 9 + \pounds 3.50 = \pounds 12.50$  and subtract 2p

Estimate on a number line



Subdivide line to estimate: 17

## 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...

## 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

## 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  $8636 - 3786 = 4850$