



Year 7 Knowledge Organiser -

Number and Place Value

Objectives

- Understand and use place value
- Order positive and negative integers, decimals and fractions
- Round numbers to decimal places or significant figures
- Use the symbols $=$, \neq , $<$, $>$, \leq , \geq
- Know primes, LCM, HCF, roots and powers
- Use the four operations with decimals
- Use the order of operations
- Estimate, cancel and simplify calculations

Key Vocabulary

- Multiple** - found by multiplying any number by positive integers
- Factor** - integers that multiply together to get another number.
- HCF** - highest common factor (biggest factor two or more numbers share)
- LCM** - lowest common multiple (the first time the times table of two or more numbers match)
- Prime** - an integer with only 2 factors
- Inverse** - the opposite function
- Approximate** - to estimate a number, amount or total often using rounding of numbers to make them easier to calculate with
- Indices / Powers** - show how many times a number or letter has been multiplied by itself
- Significant figure** - A digit that gives meaning to a number. The most significant digit (figure) in an integer is the number on the left. The most significant digit in a decimal fraction is the first non-zero number after the decimal point

Common factors and HCF

1 is a common factor of all numbers

Common factors are factors two or more numbers share

HCF - Highest common factor

HCF of 18 and 30

- 18: 1, 2, 3, 6, 9, 18
- 30: 1, 2, 3, 5, 6, 10, 15, 30

Common factors (factors of both numbers)
1, 2, 3, 6

HCF = 6

6 is the biggest factor they share

Common multiples and LCM

Common multiples are multiples two or more numbers share

LCM - Lowest common multiple

LCM of 9 and 12

- 9: 9, 18, 27, 36, 45, 54
- 12: 12, 24, 36, 48, 60

LCM = 36

The first time their multiples match



Comparing fractions

$\frac{3}{5}$ and $\frac{7}{10}$

Compare fractions using a LCM denominator

$\frac{6}{10}$ and $\frac{7}{10}$

Estimation

Estimations are useful - especially when using fractions and decimals to check if your solution is possible.

Most estimations round to 1 significant figure

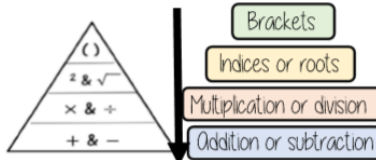
Estimations are useful - especially when using fractions and decimals to check if your solution is possible.

$$210 + 899 < 1200$$

This is true because even if both numbers were rounded up, they would reach $300 + 900$

The correct estimation would be $200 + 900 = 1100$.

Use order of operations



Brackets around negative substitutions helps remove calculation errors

Remember square roots have a positive and negative value

x	-3	-2	-1	0	1	2	3
-3	9	6	3	0	-3	-6	-9
-2	6	4	2	0	-2	-4	-6
-1	3	2	1	0	-1	-2	-3
0	0	0	0	0	0	0	0
1	-3	-2	-1	0	1	2	3
2	-6	-4	-2	0	2	4	6
3	-9	-6	-3	0	3	6	9

Symbols

- \neq 'not equal to'
- $<$ 'less than'
- $>$ 'greater than'
- \leq 'less than or equal to'
- \geq 'greater than or equal to'

M	HTh	TTh	Th	H	T	U	.	0.1	0.01	0.001
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Handwritten addition: $44.98 + 0.907$

place holder

$$\begin{array}{r} 44.980 \\ + 0.907 \\ \hline 45.887 \end{array}$$

line up decimal point

Handwritten division: $75.21 \div 4$

line up decimal point

$$\begin{array}{r} 18.8025 \\ 4 \overline{) 75.2100} \end{array}$$

Handwritten number: 4,512,098

1st sig. fig. 2nd sig. fig. etc...

(including zero digits)

Handwritten subtraction: $506.04 - 14.913$

place holders

$$\begin{array}{r} 506.040 \\ - 14.913 \\ \hline 491.127 \end{array}$$

line up decimal point

Handwritten multiplication: 0.98×14

place holder for $\times 10$

equal number of decimal places in answer

$$\begin{array}{r} 98 \\ \times 14 \\ \hline 392 \\ 980 \\ \hline 1372 \end{array}$$

Handwritten number: 0.0805

1st sig. fig. 2nd sig. fig. 3rd sig. fig.

(first non-zero digit)

Primes: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37... Squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144... Cubes: 1, 8, 27, 64, 125