Year 8 Knowledge Organiser – Number and Place Value

Objectives

Interpret Standard Form

Round numbers to decimal places or significant figures

Know primes, LCM, HCF, roots and powers

Use Prime Factorisation

Use the four operations with decimals and fractions, including mixed numbers

Use the order of operations

Apply systematic listing strategies

Key Vocabulary

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

Approximate – to estimate a number, amount or total often using rounding of numbers to make them easier to calculate with

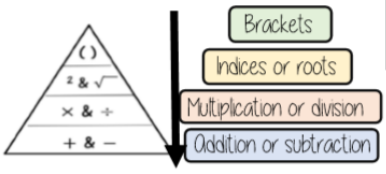
Indices / Powers – show how many times a number or letter has been multiplied by itself

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

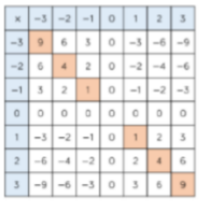
Venn Diagram – A mathematical diagram showing the relationships between sets, enclosed within a universal set.

Standard Form – A way of writing down very large or small numbers using powers of 10.

Use order or operations



Brackets around negative substitutions helps remove calculation errors



Remember square roots have a positive and negative value →

Dividing fractions

$\frac{2}{5} \div \frac{3}{4}$

$\frac{2}{5} \times \frac{4}{3}$

Multiplying by a reciprocal gives the same outcome

Tip: Convert mixed number fractions to improper fractions first!

Multiplying fractions

$2\frac{2}{5} \times 1\frac{7}{9}$

$\frac{12}{5} \times \frac{16}{9} = \frac{192}{45}$

Simplify and convert back to mixed number where possible

$\frac{192}{45} = \frac{64}{15} = 4\frac{4}{15}$

Standard form with numbers > 1

Any number between 1 and less than 10 → $A \times 10^n$ ← Any integer

Example

3.2×10^4

$= 3.2 \times 10 \times 10 \times 10 \times 10$

$= 32000$

Non-example

0.8×10^4

$5.3 \times 10^{0.7}$

Negative powers of 10

0.001	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
$1 \times \frac{1}{1000}$	10^1	10^0	10^{-1}	10^{-2}	10^{-3}
1×10^{-3}	0	0	0	0	1

Any value to the power 0 always = 1

Negative powers do not indicate negative solutions

+ and – fractions

1) Convert mixed numbers to improper
2) Find the LCM of the denominators
3) + or – the numerators (denominator stays the same)
4) Simplify and convert back to mixed number where possible

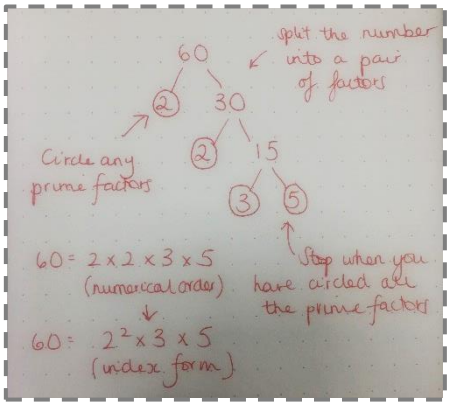
Numbers between 0 and 1

$0.054 = 5.4 \times 10^{-2}$

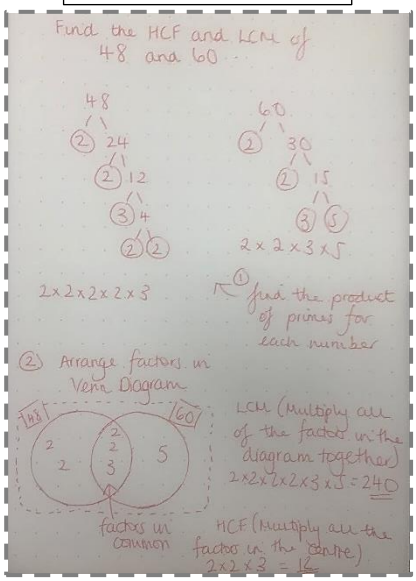
1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
10^0	10^{-1}	10^{-2}	10^{-3}
0	0	5	4

A negative power does not mean a negative answer – it means a number closer to 0

Prime Factorisation



LCM and HCF



Powers and Roots

$y^2 = y \times y$

$y^4 = y \times y \times y \times y$

$\sqrt{}$ square root $\sqrt[3]{}$ cube root