

## HIGHER GCSE UNIT SUMMARY: UNIT 1: Powers, decimals, HCF and LCM, positive and negative, roots, rounding, reciprocals, standard form, indices and surds

### 1a) Calculations, checking and rounding

Unit Description	Taught	Revision Priority
Add, subtract, multiply and divide decimals, whole numbers including any number between 0 and 1;		
Put digits in the correct place in a decimal calculation and use one calculation to find the answer to another;		
Use the product rule for counting (i.e. if there are $m$ ways of doing one task and for each of these, there are $n$ ways of doing another task, then the total number of ways the two tasks can be done is $m \times n$ ways);		
Round numbers to the nearest 10, 100, 1000, the nearest integer, to a given number of decimal places and to a given number of significant figures;		
Estimate answers to one- or two-step calculations, including use of rounding numbers and formal estimation to 1 significant figure: mainly whole numbers and then decimals.		

### 1b) Indices, roots, reciprocals and hierarchy of operations

Unit Description	Taught	Revision Priority
Use index notation for integer powers of 10, including negative powers;		
Recognise powers of 2, 3, 4, 5;		
Use the square, cube and power keys on a calculator and estimate powers and roots of any given positive number, by considering the values it must lie between, e.g. the square root of 42 must be between 6 and 7;		
Find the value of calculations using indices including positive, fractional and negative indices;		
Recall that $n^0 = 1$ and $n^{-1} = \frac{1}{n}$ , $n^{\frac{1}{2}} = \sqrt{n}$ and $n^{\frac{1}{3}} = \sqrt[3]{n}$ for any positive number $n$ ;		
Understand that the inverse operation of raising a positive number to a power $n$ is raising the result of this operation to the power $\frac{1}{n}$ ;		
Use index laws to simplify and calculate the value of numerical expressions involving multiplication and division of integer powers, fractional and negative powers, and powers of a power;		
Solve problems using index laws;		
Use brackets and the hierarchy of operations up to and including with powers and roots inside the brackets, or raising brackets to powers or taking roots of brackets;		
Use an extended range of calculator functions, including +, -, $\times$ , $\div$ , $x^2$ , $\sqrt{x}$ , memory, $x^y$ , $x^{\frac{1}{y}}$ , brackets;		
Use calculators for all calculations: positive and negative numbers, brackets, powers and roots, four operations.		

### 1c) Factors, multiples, primes, standard form and surds

Unit Description	Taught	Revision Priority
Identify factors, multiples and prime numbers;		
Find the prime factor decomposition of positive integers – write as a product using index notation (factor tree);		
Find common factors and common multiples of two numbers;		
Find the LCM and HCF of two numbers, by listing, Venn diagrams and using prime factors – include finding LCM and HCF given the prime factorisation of two numbers;		
Solve problems using HCF and LCM, and prime numbers;		
Understand that the prime factor decomposition of a positive integer is unique, whichever factor pair you start with, and that every number can be written as a product of prime factors;		
Convert large and small numbers into standard form and vice versa;		
Add, subtract, multiply and divide numbers in standard form;		
Interpret a calculator display using standard form and know how to enter numbers in standard form;		
Understand surd notation, e.g. calculator gives answer to $\sqrt{8}$ as $2\sqrt{2}$ ;		
Simplify surd expressions involving squares (e.g. $\sqrt{12} = \sqrt{4 \times 3} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}$ ).		