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**Knowledge Rich Curriculum Plan**

Year 10 Higher+ Number



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| **Lesson/Learning Sequence**  | **Intended Knowledge:***Students will know that…* | **Tiered Vocabulary**  | **Prior Knowledge:***In order to know this…* | **Assessment**  |
| **To learn how to multiply and divide decimals** | * Students will know how to solve problems involving multiplying and dividing decimals
 |  | * Students should already know how to multiply and divide integers
* Students should already know how to multiply decimals
 | Exam Prep 1 |
| **To learn how to calculate the highest common factor and lowest common multiple for two or more integers** | * Students will know 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 two factors.
* Students will know how to find the lowest common multiple (LCM) and highest common factor (HCF) of two numbers from their prime factorisation using a Venn diagram
* Students will know how to solve more complex problems using HCF, LCM and prime numbers including problems involving real life contexts
 | **Prime** – In maths, prime numbers are whole numbers greater than 1, that have only two factors: 1 and the number itself.**Product** – in maths, a product is the result of multiplication**Highest Common Factor** – the largest number that both or all of the numbers can be divided by**Lowest Common Multiple** – the smallest number that is in both numbers’ times tables | * Students should already know how to write a number as a product of its prime factors
 | Exam Prep 1 |
| **To learn how to evaluate fractional and negative indices** | * Students will know how to interpret multi step indices problems with integer bases
* Students will know how to interpret the power of 0
* Students will know how to evaluate negative powers
* Students will know how to evaluate fractional powers where the power is a unit fraction (e.g. 1/2, 1/3)
* Students will know how to evaluate more difficult fractional powers where the power is a non-unit fraction (e.g. 2/3)
 | **Indices –** plural of index, in maths, an index, or a power, is the small floating number that goes next to a number or letter | * Students should already know how to use the basic index laws for multiplication, division and brackets with integer bases
* Students will need to be able to calculate with negative numbers
* Students will need to know how to evaluate roots and powers
 | Exam Prep 1 |
| **To learn how to interpret and calculate numbers written in standard form** | * Students will know when a number is/isn't written in standard form because either a > 10 or a ≤ 0
* Students will know how to adjust a number written in the form a x 10n where a > 10 or a ≤ 0 so that it is written in standard form (in the form a x 10n where 1 ≤ a < 10)
* Students will know how to compare and order numbers written in standard form with numbers that need adjusting and decimals
* Students will know how to add and subtract numbers written in standard form
 | **Standard form -** a way of writing down very large or very small numbers easily, a number is written in standard form when it is written in the form a x 10n where 1 ≤ a < 10 | * Students should already know how to write small number in standard form
* Students should already know how to write large numbers in standard form
 | Exam Prep 1 |
| **To learn how to calculate with numbers written in standard form** | * Students will know how to multiply and divide numbers written in standard form
* Students will know how to solve more complex non-calculator standard form problems including substitution problems and worded problems
 |  | * Students should already know how to multiply and divide decimals
 | Exam Prep 1 |
| **To learn how to solve calculator problems with standard form.** | * Students will know how to carry out basic calculations with numbers written in standard form using a calculator and interpret a calculator display where answers are given in standard form or as ordinary numbers that need converting to standard form
* Students will know how to solve more complex problems with numbers written in standard form both with and without a calculator (as appropriate)
 |  | * Students will need to know how to use a calculator effectively
 | Exam Prep 1 |
| **To learn how to simplify and multiply and divide surds and how to add and subtract and expand brackets with surds** | * Students will know how to simplify surds by breaking it down into two factors, one of which is a square number
* Students will know how to multiply surds in the form $\sqrt{a}×\sqrt{b}$
* Students will know how to multiply surds in the form $a\sqrt{b}×c\sqrt{d}$
* Students will know how to simplify their answers once they have multiplied surds
* Students will know how to divide surds in the form$ \sqrt{a}÷\sqrt{b}$
* Students will know how to divide surds in the form $\frac{\sqrt{a}}{\sqrt{b}}$
* Students will know how to divide surds in the form $a\sqrt{b}÷c\sqrt{d}$
* Students will know how to solve problems involving multiplying and dividing surds
 | **Surd –** a square root which cannot be reduced to a whole number. Surds are irrational numbers.**Irrational Numbers** – Numbers which, when written in decimal form, would go on forever. | * Students will need to know their square numbers and the corresponding roots
 | Exam Prep 1 |
| **To learn how to add, subtract and expand brackets with surds** | * Students will know how to add and subtract surds by simplifying them so that the root is the same number
* Students will know that we can only ‘collect’ surds where the root is the same
* Students will know how to expand single brackets with surds, including where simplification of surds is required
 | **Expand –** open up or make bigger, in maths, expanding a bracket means we need to multiply each term in the bracket by the expression outside the bracket | * Students should already know how to collect like terms
* Students should already know how to expand single brackets
 | Exam Prep 1 |
| **To learn how to expand double brackets with surds and rationalise simple denominators** | * Students will know how to expand and simplify double brackets with surds including where resulting surds need simplifying. They will know how to do this where the numerator is an integer, single surd or an expression involving surds and/or integers
* Students will know how to rationalise the denominator when a single surd is in the denominator
 | **Rationalise –** to make rational**Rational Number –** a number that can be expressed as a fraction**Irrational Number –** Numbers which, when written in decimal form, would go on forever.**Denominator –** the bottom number in a fraction | * Students will need to know how to simplify surds
* Students will need to know how to expand double brackets with algebra
 | Exam Prep 1 |
| **To learn how to rationalise the denominator** | * Students will know how to rationalise the denominator when the denominator has two parts separated by a + or a - e.g. $\frac{5}{\sqrt{2}+1}$ or $\frac{\sqrt{2}+3}{\sqrt{3}-1}$ etc.
* Students will know how to solve more complex, multi-step, exam style problems involving surds
 |  | * Students will need to know how to expand double brackets with surds
 | Exam Prep 1 |