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**Knowledge Rich Curriculum Plan**

Year 11 Higher – Number 1



| **Lesson/Learning Sequence**  | **Intended Knowledge:***Students will know that…* | **Tiered Vocabulary**  | **Prior Knowledge:***In order to know this, students need to already know that…* | **Assessment**  |
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| **To learn how to evaluate fractional and negative indices** | * 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**Reciprocal** – The reciprocal of a number is 1 divided by the number | * Students will need to know how to use the basic index laws for multiplication, division and brackets with integer base
* 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 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 will need to know how to write a number as a product of its prime factors
 | Exam Prep 1 |
| **To learn how to calculate with 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 numbers written in standard form and how the x10^n affects the size of one number compared with another
* Students will know how to multiply and divide numbers written in standard form
* Students will know how to add and subtract numbers written in standard form without a calculator
 | **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 will need to know how to write large and small numbers in standard form
* Students will need to know how to convert numbers from being written in standard form back into ordinary numbers
* Students will need to know how to use the index laws for multiplication and division
 | Exam Prep 1 |
| **To learn how to solve problems with standard form.** | * Students will know how to add and subtract numbers written in standard form without a calculator
* 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 add and subtract surds and expand single 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 will need to know how to simplify surds
* Students will need to know how to expand single brackets with algebra
 | 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 |
| **To learn how to add, subtract, multiply and divide with fractions** | * Students will know how to add and subtract mixed numbers
* Students will know how to multiply and divide mixed numbers
* Students will know how to multiply and divide an integer by a fraction or mixed number
* Students will know how to multiply and divide a fraction or mixed number by an integer
* Students will know how to solve worded problems involving calculating with fractions and mixed numbers
 | **Denominator –** the bottom number in a fraction**Numerator –** the top number in a fraction | * Students will need to know how to add, subtract, multiply and divide fractions
* Students will need to know how to simplify fractions
* Students will need to know how to convert between mixed numbers and improper fractions
 | Exam Prep 1 |
| **To learn how to calculate percentage change, profit and loss** | * Students will know how to calculate percentage change, percentage profit and percentage loss both with an without a calculator (as appropriate)
* Students will know that $percentage change=\frac{change}{original}×100$
* Students will know that $percentage profit=\frac{profit}{expense}×100$
* Students will know that $percentage loss=\frac{loss}{expense}×100$
 | **Profit –** a financial gain, the difference between the amount earned and the amount spent in buying, operating, or producing something | * Students will need to know how to calculate percentages of amounts
 | Exam Prep 1 |
| **To learn how to solve problems involving reverse percentages** | * Students will know how to find the original amount given the final amount after a percentage increase or decrease (reverse percentages), including VAT both with and without a calculator (as appropriate)
 | **VAT – Value Added Tax** – a tax that is applied to the purchase price of certain goods, services and other taxable supplies that are bought and sold within the UK. Standard VAT is 20%. | * Students will need to know how to write a ratio in the form 1:n
 | Exam Prep 1 |
| **To learn how to solve problems involving compound interest and depreciation** | * Students will know how to calculate a repeated percentage change including compound interest and depreciation
* Students will know how to determine the number of years interest has been accrued for given the starting and end value
* Students will know how to work out the interest rate when compound interest has been accrued for a given number of years, given the starting and end amounts
 | **Interest -** a fee paid for borrowing money or other assets or an amount earned by saving money in a bank account that pays it**Compound Interest –** the interest on a loan or deposit that accrues on both the initial principal and the accumulated interest from previous periods.**Depreciation –** a decrease in the value**Accumulated –** built up over time**Accrued –** received**Initial –** starting/original amount **Annum –** year | * Students will need to know how to increase by a percentage
* Students will need to know how to convert percentages into decimals
* Students will need to know how to solve linear equations using inverse operations
 | Exam Prep 1 |