Year 10 Higher| |Term 1 | Knowledge Organiser

Index Laws

1	Powers of	The powers of a number are that number raised to various powers
2	Multiplication index law	When multiplying the same base, add the powers
3	Division index law	When dividing with the same base, subtract the powers
4	Brackets index laws	When raising a power to another power, multiply the powers together
5	Negative powers	Performs the reciprocal
6	Fractional powers	The denominator of the fractional power acts as the root. The numerator of a fractional power acts as a normal power
7	Surds	A number left in a square root form that are used when detailed accuracy is required in a calculation
8	Rationalise the denominator	Multiply the numerator and denominator by an expression that makes the denominator an integer

Ratio & Proportion

1	Compound interest formula	$\text{Total accrued} = P\left(1+\frac{r}{100}\right)^n$
2	Percentage change	$\text{Percentage change} = \frac{\text{Change}}{\text{Original}} \times 100$
3	Depreciation	A decrease in the value of something over time
4	Growth	The values increase exponentially, the constant multiplier is more than one.
5	Decay	The values get closer to 0, the constant multiplier is less than one.
6	$y = kx$	y is directly proportional to x
7	$y = \frac{k}{x}$	y is inversely proportional to x

Inequalities

1	Linear sequence	A number pattern with a common difference
2	Fibonacci sequence	A sequence where the next number is found by adding up the previous two terms
3	Geometric sequence	A sequence when the term-to-term rule is multiply or divide
4	Quadratic sequence	A sequence that involves square numbers
5	Triangular numbers	The sequence which comes from a pattern of dots that form a triangle 1, 3, 6, 10

Straight line graphs

1	Midpoint of a line	Add the x coordinates and divide by 2, add the y coordinates and divide by 2
2	Axes	A fixed reference line on a grid to help show the position of coordinates
3	Linear graph	Straight line graph
4	$y = mx + c$	M is the gradient C is the y-intercept
5	Gradient	How steep the line is
6	Gradient	$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$
7	Parallel lines	Have the same gradient
8	Perpendicular lines	The product of the gradients will always equal -1
9	Perpendicular lines	The gradient of perpendicular lines is the negative reciprocal
10	Reciprocal	Found by doing 1 divided by the number
11	Equation of a circle	$x^2 + y^2 = r^2$