## Year 10 Maths Learning Journey

## Autumn Term 4

Developing Algebra: Simultaneous Equations

| Core knowledge | Reference |
| :--- | :---: |
| Understand that equations can have more than one solution <br> "What possible solutions are there? Are there an infinite number of solutions? Why/Why not?" | Worksheet |
| Determine whether a given ( $x$, y) is a solution to a pair of linear simultaneous equations <br> "Why is there only one solution to two equations containing two variables?" | Worksheet |
| Solve a pair of linear simultaneous equations by substituting a known variable <br> "What are the steps in solving this equation?" | Worksheet |
| Solve a pair of linear simultaneous equations by substituting an expression <br> "How can you check your answers?" | Worksheet |
| Solve a pair of linear simultaneous equations using graphs <br> "What is true about the coordinates of the point where two lines meet? How do they relate to the <br> equations?" | Worksheet |
| Solve a pair of linear simultaneous equations by subtracting equations <br> "Why is it useful to 'eliminate' one of the variables?" | Worksheet |
| Solve a pair of linear simultaneous equations by adding equations <br> "Does it matter which equation we substitute into?" | Worksheet |
| Use a given equation to derive related facts (R) <br> "What happens when we substitute our original solutions into the equivalent equations? Why <br> does this happen?" | Worksheet |
| Solve a pair of linear simultaneous equations by adjusting one equation <br> "Why do we need the coefficient of one of the variables to be the same in both equations? How <br> does this help us to solve the equations?" | Worksheet |
| Solve a pair of linear simultaneous equations by adjusting both equations <br> "When making the coefficients the same, which variable should we choose?" |  |
| Form a pair of linear simultaneous equations from given information <br> "How could we check whether the equation we have written down is correct?" | Worksheet |
| Form and solve pair of linear simultaneous equations from given information <br> "When making the coefficients the same, which variable should we choose? How do we know <br> whether to add or subtract the equations?" | Worksheet |
| Determine whether a given (x, $y$ is a solution to both a linear and quadratic equation (H) <br> "What's the same and what's different about the equations of a straight line and the equations of <br> a curve?" | Worksheet |
| Solve a pair of simultaneous equations (one linear, one quadratic) using graphs (H) <br> "Why is it easier to substitute back into the linear equation to find the value of $y ? "$ | Worksheet |


| Solve a pair of simultaneous equations (one linear, one quadratic) algebraically (H) |  |
| :--- | :---: |
| "Which method is most efficient?" | Worksheet |
| Solve a pair of simultaneous equations involving a third unknown (H) <br> "If I replaced the constant with a number would you be able to solve the pair of <br> equations" | Worksheet |

## Learning Checkpoints

| LC Title | Completed | Dirt |
| :--- | :--- | :--- |
| Simultaneous Equations |  |  |

## Key Vocabulary:

Co-ordinate: In geometry, a coordinate system is a system which uses one or more numbers, or coordinates, to uniquely determine the position of a point in space
Dashed line: Inequalities that use < or > symbols are plotted with a dashed line to show that the line is not included in the region.
Equation: A mathematical statement showing that two expressions are equal.
Expression: A mathematical form expressed symbolically.
Factorise: To express a number or a polynomial as the product of its factors.
Inequality: When one number, or quantity, is not equal to another.
Intersect: To have a common point or points.
Inverse operations: Operations that, when they are combined, leave the entity on which they operate unchanged.
Linear: In algebra, describing an expression or equation of degree one.
Number line: A straight, horizontal line with numbers placed at even increments along the length.
Quadratic: Describing a expression of the form $\mathrm{ax2}+\mathrm{bx}+\mathrm{c}$ where $\mathrm{a}, \mathrm{b}$ and c are real numbers.
Region: a non-empty connected open set in a topological space, in particular any non-empty connected open subset of the real coordinate space $\mathrm{R}^{n}$ or the complex coordinate space $\mathrm{C}^{n}$
Roots: A solution to an equation, usually expressed as a number or an algebraic formula.
Satisfy: A value (or values) that solve an equation.
Set notation: Used in mathematics to essentially list numbers, objects or outcomes.
Solid line: Inequalities that use $\leq$ or $\geq$ symbols are plotted with a solid line to show that the line is included in the region.
Solution: A value or values which, when substituted for a variable in an equation, make the equation true.
Solution set: The set containing all the solutions of an equation
Solve: To find a value (or values) we can put in place of a variable that makes the equation true
Solve graphically: Plot two equations, look for the point where the two graphs cross one another.
Test point: a chosen point to test the inequality not on the line drawn, where the point lies in one of the half-planes formed by the boundary line.
Union: The set made by combining the elements of two sets
Unknown: A number we do not know. Also known as variables and represented by algebraic terms.
Value: refers to the worth of each digit depending on where it lies in the number.
Variable: a symbol (usually a letter) standing in for an unknown numerical value in an equation.
$y$-intercept: The point where a line or curve crosses the $y$-axis of a graph. In other words: find the $y$ value when $x$ equals 0 .

