|  |  |  |
| --- | --- | --- |
| **Topic/Skill** | **Definition/Tips** | **Example**  **Topic: Simultaneous Equations** |
| 1. Simultaneous Equations | A set of **two or more equations**, each involving **two or more variables** (letters).  The **solutions** to simultaneous equations **satisfy both**/all of the **equations**. |  |
| 2. Variable | A **symbol**, usually a **letter**, which **represents a number** which is usually unknown. | In the equation , is the variable. |
| 3. Coefficient | A **number** used to **multiply** a **variable**.  It is the number that comes before/in front of a letter. | 6z  6 is the coefficient  z is the variable |
| 4. Solving Simultaneous Equations (by Elimination) | 1. **Balance** the **coefficients** of one of the variables.  2. **Eliminate** this variable by adding or subtracting the equations (**Same Sign Subtract, Different Sign Add**)  3. **Solve** the linear equation you get using the other variable.  4. **Substitute** the value you found back into one of the previous equations.  5. **Solve** the equation you get.  6. **Check** that the two values you get satisfy both of the original equations. | Multiply the first equation by 2.  Same Sign Subtract (+10x on both)  Substitute in to equation.  Solution: |
| 5. Solving Simultaneous Equations (by Substitution) | 1. **Rearrange** one of the equations into the form or  2. **Substitute** the right-hand side of the rearranged equation into the other equation.  3. Expand and **solve** this equation.  4. **Substitute** the value into the or equation.  5.  **Check** that the two values you get satisfy both of the original equations. | Rearrange:  Substitute:  Solve:  Substitute:  Solution: |
| 6. Solving Simultaneous Equations  (Graphically) | **Draw the graphs** of the two equations.  The **solutions** will be **where the lines meet**.  The solution can be written as a **coordinate**. | and  They meet at the point with coordinates (2,3) so the answer is and |
| 7. Solving Linear and Quadratic Simultaneous Equations | Method 1: If both equations are in the same form (eg. Both …):  1. Set the equations **equal to each other**.  2. **Rearrange** to make the equation **equal to zero**.  3. **Solve** the quadratic equation.  4. **Substitute** the values back in to one of the equations.  Method 2: If the equations are not in the same form:  1.  **Rearrange** the linear equation into the form or  2. **Substitute** in to the quadratic equation.  3. **Rearrange** to make the equation **equal to zero**.  4. **Solve** the quadratic equation.  5. **Substitute** the values back in to one of the equations.  You should get **two pairs of solutions** (two values for , two values for .)  Graphically, you should have **two points of intersection**. | Example 1  Solve  and  and  and    Answers: (4,3) and (-1,-2)  Example 2  Solve and  and  and  Answers: (2,1) and (1,2) |

**Knowledge Organiser**