**Kinematics 3 :**

**rearranging and solving for each variable from the 2nd kinematics equation**

Solving for final velocity

|  |  |
| --- | --- |
| **Equation** | **Reason** |
|  | To solve for final velocity you need to get by itself (get it to not be squared) |
|  | Before substituting values you need to square root each side to cancel out the square on . This will leave by itself |
|  | You are done and have solved for final velocity. Substitute in your values for to finish and solve |

Solving for initial velocity

|  |  |
| --- | --- |
| **Equation** | **Reason** |
|  | Start with the kinematics equation. We are trying to get initial velocity by itself (alone on one side of the equation) |
|  | The term “ “ is being added to the initial velocity term. Therefore we can subtract “ “ from both sides to move it to the other side. |
|  | Re-write what you have. Now initial velocity is alone on one side, this is good but we’re not done yet. We need to get rid of the squared part still. |
|  | Square root both sides to cancel out the squared on initial velocity |
|  | Re-write what you have. |
|  | **You are done. The equation is solved for initial velocity and you just need to substitute in known values to solve.** |

**Kinematics 3 :**

**rearranging and solving for each variable from the 2nd kinematics equation**

Solving for final velocity

|  |  |
| --- | --- |
| **Equation** | **Reason** |
|  | To solve for final velocity you need to get by itself (get it to not be squared) |
|  | Before substituting values you need to square root each side to cancel out the square on . This will leave by itself |
|  | You are done and have solved for final velocity. Substitute in your values for to finish and solve |

Solving for initial velocity

|  |  |
| --- | --- |
| **Equation** | **Reason** |
|  | Start with the kinematics equation. We are trying to get initial velocity by itself (alone on one side of the equation) |
|  | The term “ “ is being added to the initial velocity term. Therefore we can subtract “ “ from both sides to move it to the other side. |
|  | Re-write what you have. Now initial velocity is alone on one side, this is good but we’re not done yet. We need to get rid of the squared part still. |
|  | Square root both sides to cancel out the squared on initial velocity |
|  | Re-write what you have. |
|  | **You are done. The equation is solved for initial velocity and you just need to substitute in known values to solve.** |

Solving for acceleration

|  |  |
| --- | --- |
| **Equation** | **reason** |
|  | Start with the original equation. We are going to arrange it (algebra) so that it is solved for acceleration. |
|  | we want acceleration by itself so let’s get the “ “ term to the other side. It is being added so let’s subtract it from both sides |
|  | Re-write the equation. The “ is now on the other side. |
|  | We still need to get acceleration by itself. Let’s move the 2 over by dividing both sides by 2. |
|  | Re-write what you have now. The 2 is canceled out because . |
|  | Almost done. Acceleration is being multiplied by displacement so we will divide both sides by displacement to get acceleration alone. |
|  | Re-write what you have. The displacement is cancelled out on the right hand side and leaves acceleration alone. |
|  | **The work is done. You have solved for acceleration and just need to substitute values in to solve.** |

Solving for displacement

|  |  |
| --- | --- |
| **Equation** | **Reason** |
|  | Start with the original kinematics equation. We are trying to solve for by getting it by itself. |
|  | we want displacement by itself so let’s get the “ “ term to the other side. It is being added so let’s subtract it from both sides |
|  | Re-write the equation. The “ is now on the other side. |
|  | Re-write the equation. The “ is now on the other side. We still need to get acceleration by itself. Let’s move the 2 over by dividing both sides by 2. |
|  | Re-write what you have now. The 2 is canceled out because . |
|  | Almost done. Acceleration is being multiplied by displacement so we will divide both sides by acceleration to get alone. |
|  | Re-write what you have. Acceleration cancels out because and is left alone. |
|  | **You are done. The equation is solved for displacement and you just need to substitute in your known values and solve.** |

Solving for acceleration

|  |  |
| --- | --- |
| **Equation** | **reason** |
|  | Start with the original equation. We are going to arrange it (algebra) so that it is solved for acceleration. |
|  | we want acceleration by itself so let’s get the “ “ term to the other side. It is being added so let’s subtract it from both sides |
|  | Re-write the equation. The “ is now on the other side. |
|  | We still need to get acceleration by itself. Let’s move the 2 over by dividing both sides by 2. |
|  | Re-write what you have now. The 2 is canceled out because . |
|  | Almost done. Acceleration is being multiplied by displacement so we will divide both sides by displacement to get acceleration alone. |
|  | Re-write what you have. The displacement is cancelled out on the right hand side and leaves acceleration alone. |
|  | **The work is done. You have solved for acceleration and just need to substitute values in to solve.** |

Solving for displacement

|  |  |
| --- | --- |
| **Equation** | **Reason** |
|  | Start with the original kinematics equation. We are trying to solve for by getting it by itself. |
|  | we want displacement by itself so let’s get the “ “ term to the other side. It is being added so let’s subtract it from both sides |
|  | Re-write the equation. The “ is now on the other side. |
|  | Re-write the equation. The “ is now on the other side. We still need to get acceleration by itself. Let’s move the 2 over by dividing both sides by 2. |
|  | Re-write what you have now. The 2 is canceled out because . |
|  | Almost done. Acceleration is being multiplied by displacement so we will divide both sides by acceleration to get alone. |
|  | Re-write what you have. Acceleration cancels out because and is left alone. |
|  | **You are done. The equation is solved for displacement and you just need to substitute in your known values and solve.** |