

Kinematic Equations Algebra

Objective:

Algebraically solve each of the following equations

Name	Equation
Definition of Acceleration	$v_f = v_i + a \cdot \Delta t$
The King of Kinematic Equations	$\Delta x = v_i \cdot \Delta t + \frac{1}{2} a (\Delta t)^2$
The Average Velocity Formula	$\Delta x = \left(\frac{v_i + v_f}{2} \right) \Delta t$
No-Time Equation	$v_f^2 = v_i^2 + 2a \cdot \Delta x$

For each of the following situations, solve for an equation for the *variable* in terms of the *known quantities*.

Variable: initial velocity

Known quantities: final velocity, acceleration, and time

Variable: time

Known quantities: final velocity, initial velocity, and acceleration

Variable: acceleration

Known quantities: time, initial velocity, and displacement

Variable: initial velocity

Known quantities: time, acceleration, and displacement

Variable: initial velocity

Known quantities: time, final velocity, and displacement

Variable: time

Known quantities: initial velocity, final velocity, and displacement

Variable: final velocity

Known quantities: initial velocity, time, and displacement

Variable: initial velocity

Known quantities: final velocity, acceleration, and displacement

Variable: acceleration

Known quantities: initial velocity, final velocity, and displacement

Variable: displacement

Known quantities: initial velocity, final velocity, and acceleration

Variable: time**

Known quantities: displacement, initial velocity, and acceleration

** Note that deriving this equation involves using the *quadratic equation*.

BONUS: Simplify this by using one of the other kinematic equations!

Memorizing the kinematic equations:

Seriously, you should do this.

If you actually solved all of the previous problems, then this should not be too difficult.