

Algebraic Manipulation of the Kinematic Equations

Algebraic manipulation of a given equation is crucial for success in physics classes and is a skill that will be constantly used during class. This exercise is designed to hone your algebra skills for this new set of motion equations that we will be using for the entire semester.

Directions: Rearrange the given equation for each desired variable.

$$v = v_0 + at$$

Solve this equation for v_0 , a , and t .

$$v = v_0 + at$$

Solve for v_0 .

$$v = v_0 + at$$

Solve for a .

$$v = v_0 + at$$

Solve for t .

$$\Delta d = v_0 t + \frac{1}{2}at^2$$

Solve this equation for v_0 , a , and t .

$$\Delta x = v_0 t + \frac{1}{2}at^2$$

Solve for v_0 .

$$\Delta x = v_0 t + \frac{1}{2}at^2$$

Solve for a .

$$\Delta x = v_0 t + \frac{1}{2}at^2$$

Solve for t . ***

$$v^2 = v_o^2 + 2a\Delta d$$

Solve this equation for v_o , a , and Δd .

$$v^2 = v_o^2 + 2a\Delta d$$

Solve for v_o .

$$v^2 = v_o^2 + 2a\Delta d$$

Solve for a .

$$v^2 = v_o^2 + 2a\Delta d$$

Solve for Δd .

<u>Variable</u>	<u>Meaning</u>
d_o	Initial or starting position of an object. If the origin is placed at this location then $d_o = 0$.
d_f	Final location or position of an object.
Δd	The horizontal displacement of an object.
v_o	Initial or starting velocity of an object at time = 0.
v or v_f	Final velocity of an object.
Δv	The change in object's velocity.
\bar{v}	The average velocity of the object.
a	The object's acceleration.
t_o	The starting time. If the clock is started at this moment then $t_o = 0$.
t_f	The final time.
Δt	The time interval of interest in the problem.
subscript x	indicates the d or horizontal direction.
subscript y	indicates the y or vertical direction.

Based on the work of Mr. Jeff Alimo.