

the constant-acceleration kinematics variables, when $a \neq 0$ (i.e., changing velocity)

$\Delta x, v_{ix}, v_{fx}, a_x, t$	$t, \Delta y, v_{iy}, v_{fy}, a_y$
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the constant-acceleration kinematics equations, when $a \neq 0$ (i.e., changing velocity)

x equations	missing variables	y equations	missing variables
$v_{fx} = v_{ix} + a_x t$	Δx	$v_{fy} = v_{iy} + a_y t$	Δy
$\Delta x = \frac{v_{ix} + v_{fx}}{2} t$	a_x	$\Delta y = \frac{v_{iy} + v_{fy}}{2} t$	a_y
$v_{fx}^2 = v_{ix}^2 + 2a_x \Delta x$	t	$v_{fy}^2 = v_{iy}^2 + 2a_y \Delta y$	t
$\Delta x = v_{ix} t + \frac{1}{2} a_x t^2$	v_{fx}	$\Delta y = v_{iy} t + \frac{1}{2} a_y t^2$	v_{fy}
$\Delta x = v_{fx} t - \frac{1}{2} a_x t^2$	v_{ix}	$\Delta y = v_{fy} t - \frac{1}{2} a_y t^2$	v_{iy}

the constant-acceleration kinematics equation, when $a=0$ (i.e., constant velocity)

x equation: $\Delta x = v_x t$	y equation: $\Delta y = v_y t$
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the systematic, five-step method for solving constant-acceleration kinematics problems

1. Draw the object's path. Label the initial and final positions. Draw velocity and acceleration vectors.	
2. If you haven't done so already, write down axes and positive directions.	
3. Break displacement, velocity, and acceleration into components. (Not necessary for one-dimensional motion.)	
4. For each component, identify whether a is zero or non-zero. For projectile motion, $a_x=0$, and $a_y=9.8\text{m/s}^2$ down. If $a=0$ (i.e., constant velocity) for a component, write down $\Delta x = v_x t$ or $\Delta y = v_y t$ for that component.	
5. If $a=0$, when you know values for two of the three kinematics variables, you can solve the equation for the remaining variable.	If $a \neq 0$ (i.e., changing velocity) for a component, write down the five kinematics variables for the component.
Underneath the variables, write down the given values, including signs, and indicate the question with a "?". You don't need to use SI units in the kinematics equations, but make sure you're using <i>consistent</i> units.	
5. If $a=0$, when you know values for two of the three kinematics variables, you can solve the equation for the remaining variable.	If $a \neq 0$, when you know values for three of the kinematics variables, you can choose an equation. Identify the one variable you don't care about, and pick the equation that is missing that variable. Plug in and solve.
6. Use the fact that the time t is the same for both components.	

Tips: In the instant you change direction in a component, the velocity for that component is zero. Constant-acceleration motion is symmetric. For multi-part or multi-object problems, write down multiple sets of kinematics variable "frameworks", and think about which variables are the same or different in the various frameworks.