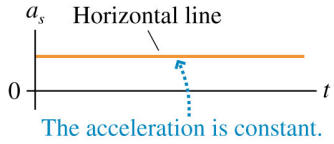
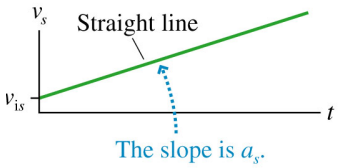
Motion with Constant Acceleration

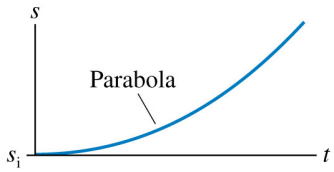


If acceleration is constant, then: $a_s = \dfrac{dv_s}{dt} \quad \Rightarrow \quad dv_s = a_s\, dt$



From this expression and we get:

$$v_f = v_i + a\,\Delta t$$



by integrating the above, we get:

$$s_f = s_i + v_i\,\Delta t + \frac{1}{2}a\,(\Delta t)^2$$

using equations above we get:

$$v_f^2 = v_i^2 + 2a\,\Delta s$$

Three equations to rule all of (constant acceleration) kinematics

Motion with Constant Acceleration

Displacement: $\Delta s = s_f - s_i$ Velocity: $v_s = \dfrac{ds}{dt}$ Acceleration: $a_s = \dfrac{dv_s}{dt}$

If acceleration is constant, then:

3 Equations

$$v_f = v_i + a\,\Delta t$$

$$s_f = s_i + v_i\,\Delta t + \frac{1}{2}a\,(\Delta t)^2$$

$$v_f^2 = v_i^2 + 2a\,\Delta s$$

5 Variables

$\boldsymbol{\Delta s = s_f - s_i}$

$\boldsymbol{v_i}$

$\boldsymbol{v_f}$

$\boldsymbol{a}$

$\boldsymbol{\Delta t}$

Which equation(s) you need in a given problem depend on the information you are given. But if you are given 3 (distinct) variables, you can always get the other 2.