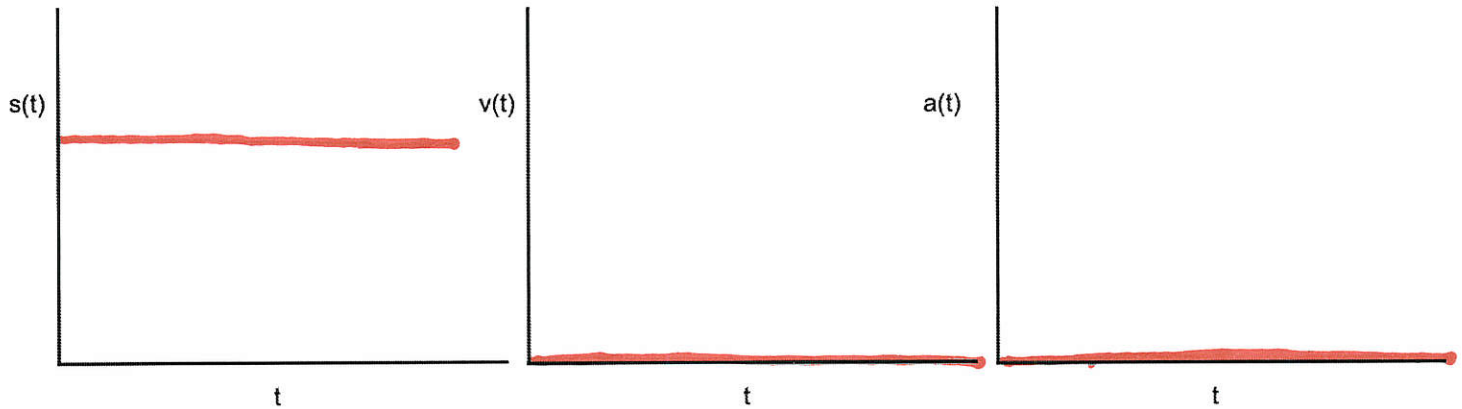
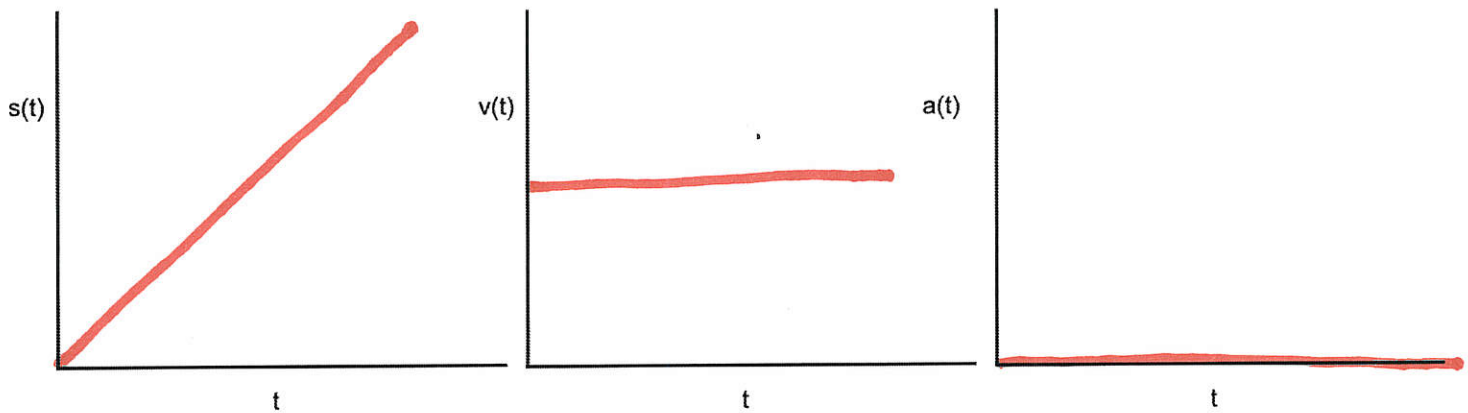
Kinematic Motion Graphs and Equations

Object is **Not Moving**



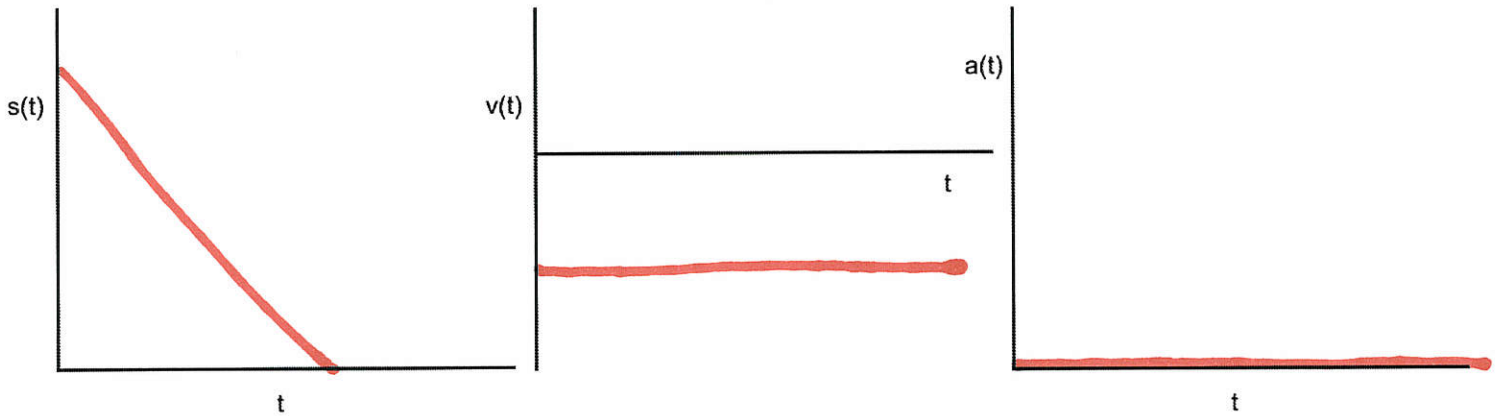
$s(t) = s_0$ $\quad$ $v = 0$ $\quad$ $a = 0$

Object has a **Constant Velocity** in **Positive** direction



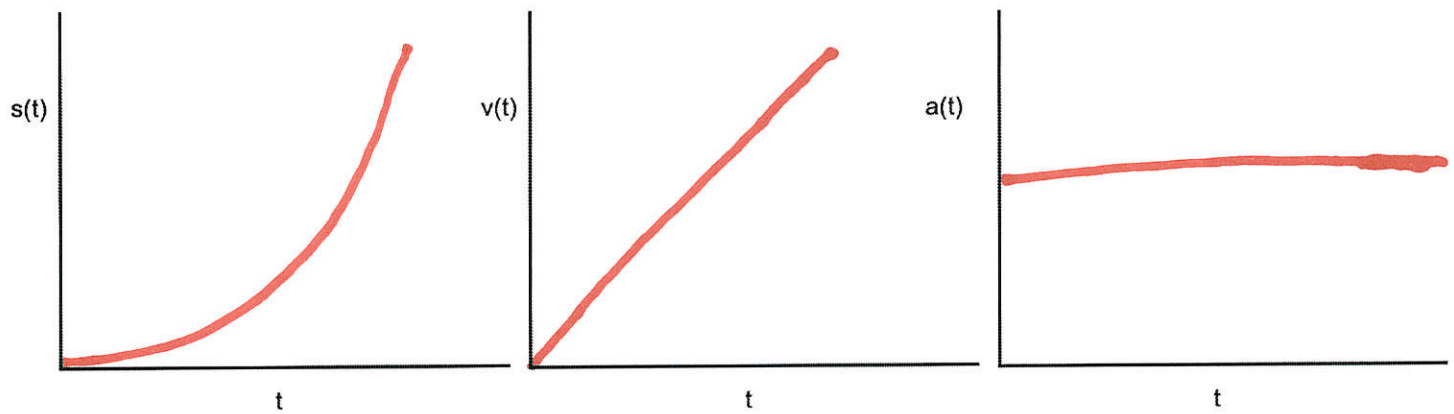
$s(t) = s_0 + v_0 t$ $\quad$ $v = v_0$ $\quad$ $a = 0$

Object has a **Constant Velocity** in **Negative** direction



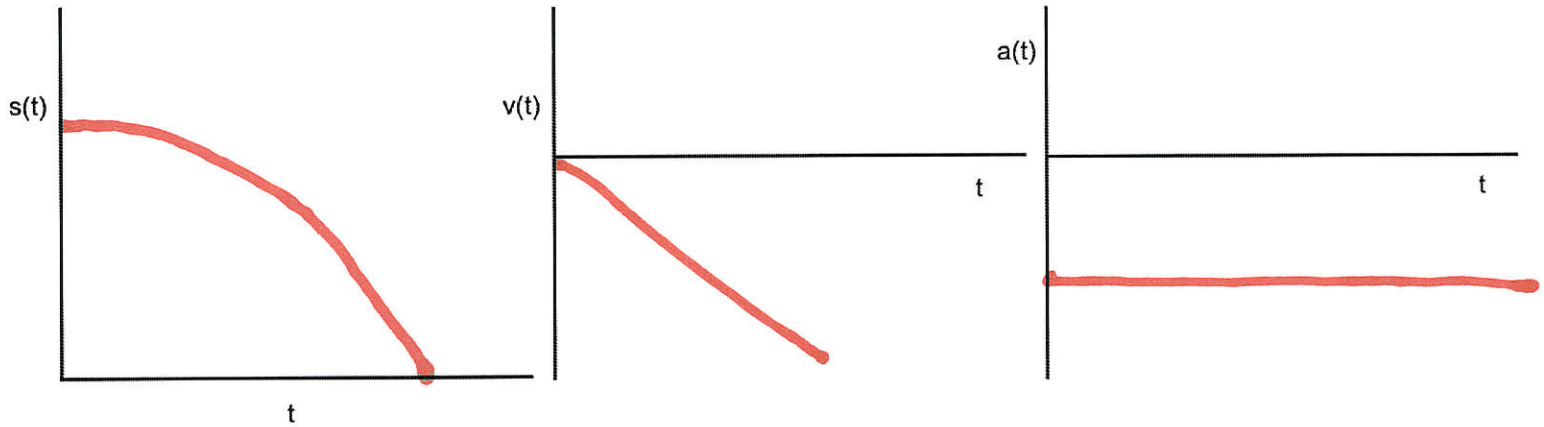
$s(t) = s_0 - v_0 t$ $\qquad$ $v = -v_0$ $\qquad$ $a = 0$

Object is **Accelerating** in **Positive** direction



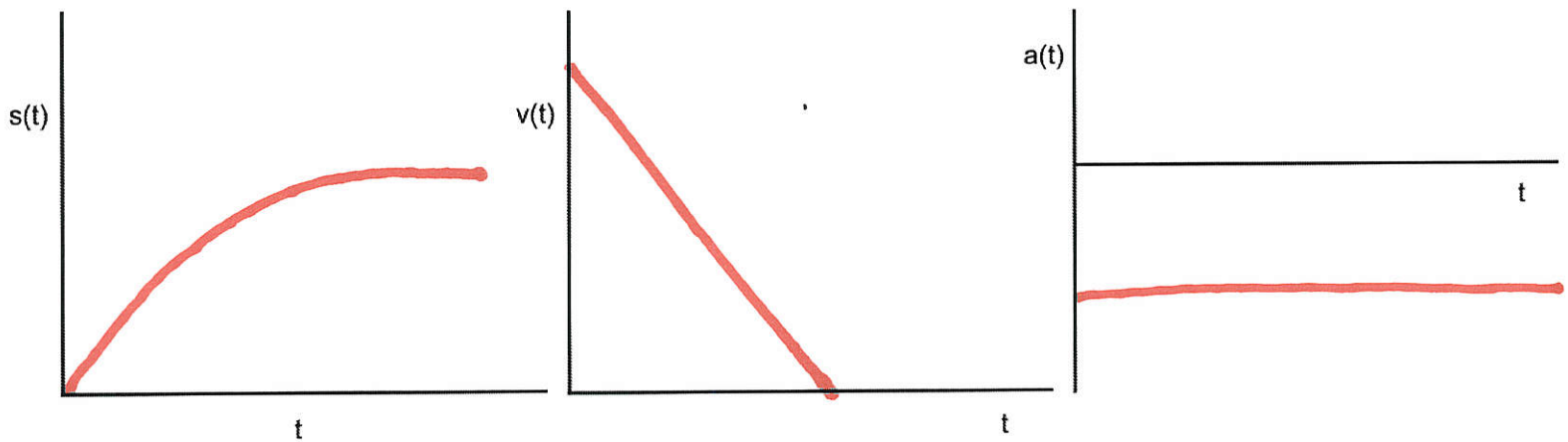
$s(t) = s_0 + v_0 t + \frac{1}{2} at^2$ $\qquad$ $v = v_0 + at$ $\qquad$ $a = a_0$

Object is **Accelerating** in **Negative** direction



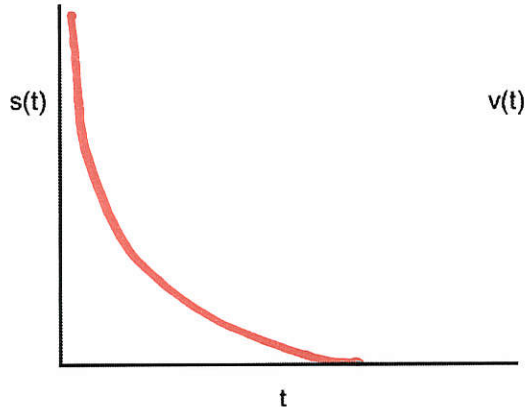
$s(t) = s_0 - v_0t - \frac{1}{2} at^2$ $\quad$ $v = -v_0 - at$ $\quad$ $a = -a_0$

Object is **Decelerating** in **Positive** direction

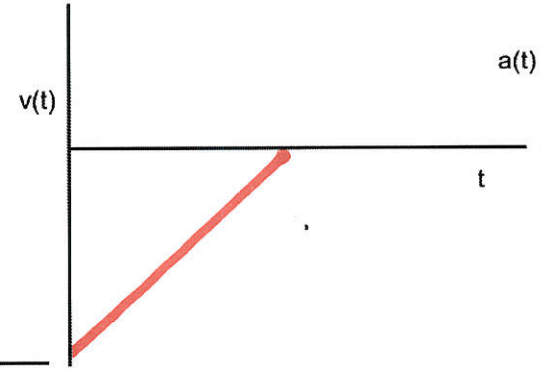


$s(t) = s_0 + v_0t - \frac{1}{2} at^2$ $\quad$ $v = v_0 - at$ $\quad$ $a = -a_0$

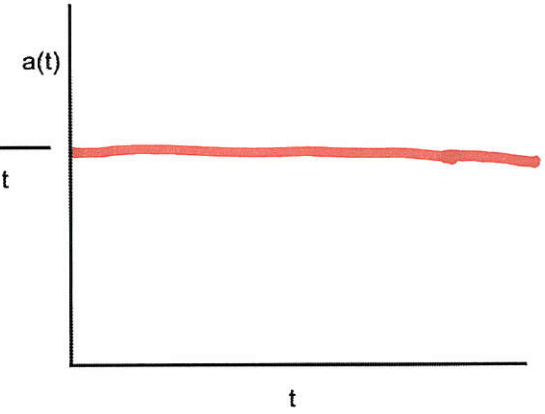
Object is **Decelerating** in **Negative** direction



$s(t) = s_0 - v_0 t + \frac{1}{2} at^2$



$v = -v_0 + at$



$a = a_0$