$$\bar{v} = \frac{\Delta x}{t}$$

$$\Delta x = \bar{v} t$$

$$\Delta x = \left(\frac{v_f + v_0}{2}\right)\left(\frac{v_f - v_0}{a}\right)$$

$$2a\Delta x = (v_f + v_0)(v_f - v_0)$$

$$a = \frac{v_f - v_0}{t}$$

$$t = \frac{v_f - v_0}{a}$$

$$\boxed{2a\Delta x = v_f^2 - v_0^2}$$

$$\bar{v} = \frac{\Delta x}{t}$$

$$a = \frac{v_f - v_0}{t} \qquad v_f = v_0 + at$$

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

$$2a\Delta x = v_f^2 - v_0^2 \qquad v_f^2 = v_0^2 + 2a\Delta x$$

ALL OBJECTS IN FREE FALL

HAVE THE SAME ACCELERATION

$a = 9.8\ m/s^2$ DOWN $\approx 10\ m/s^2$ g