Freefall Notes 9/3/19

$V = \frac{\Delta x}{t}$ $a = \frac{\Delta V}{t}$ $V_f = V_i + at$

$d = V_i t + \frac{1}{2}at^2$ $V_f^2 = V_i^2 + 2ad$

★ gravity on Earth is always $-9.8\ m/s^2$ ★

Example problem:

Mrs. Mikula is standing at the top of the Grand Canyon which is 1857 m tall. She drops her cell phone off the edge of the cliff. How long is the cell phone in the air?

① Write Givens:
$d = -1857\ m$
$a_g = -9.8\ m/s^2$
$V_i = 0\ m/s$
$t = ?$

② choose formula:
$d = V_i t + \frac{1}{2}at^2$

③ Plug in #s
$-1857 = 0(t) + \frac{1}{2}(-9.8)t^2$
$-1857 = \frac{1}{2}(-9.8)t^2$

④ solve:
$\frac{-1857}{-4.9} = \frac{-4.9t^2}{-4.9}$
$\sqrt{378.98} = \sqrt{t^2}$
$19.4s = t$

What is the final velocity of the cell phone right before it hits the grand?

$$V_f = V_i + at$$

$$V_f = 0 + (-9.8)(19.4s)$$

$$\boxed{V_f = -190.12\ m/s}$$

Things to remember:

If an object is being dropped, it's initial velocity (V_i) is 0 m/s.

If an object is being thrown up, it's final velocity (V_f) at the top of it's path (before it comes back down) is 0 m/s.