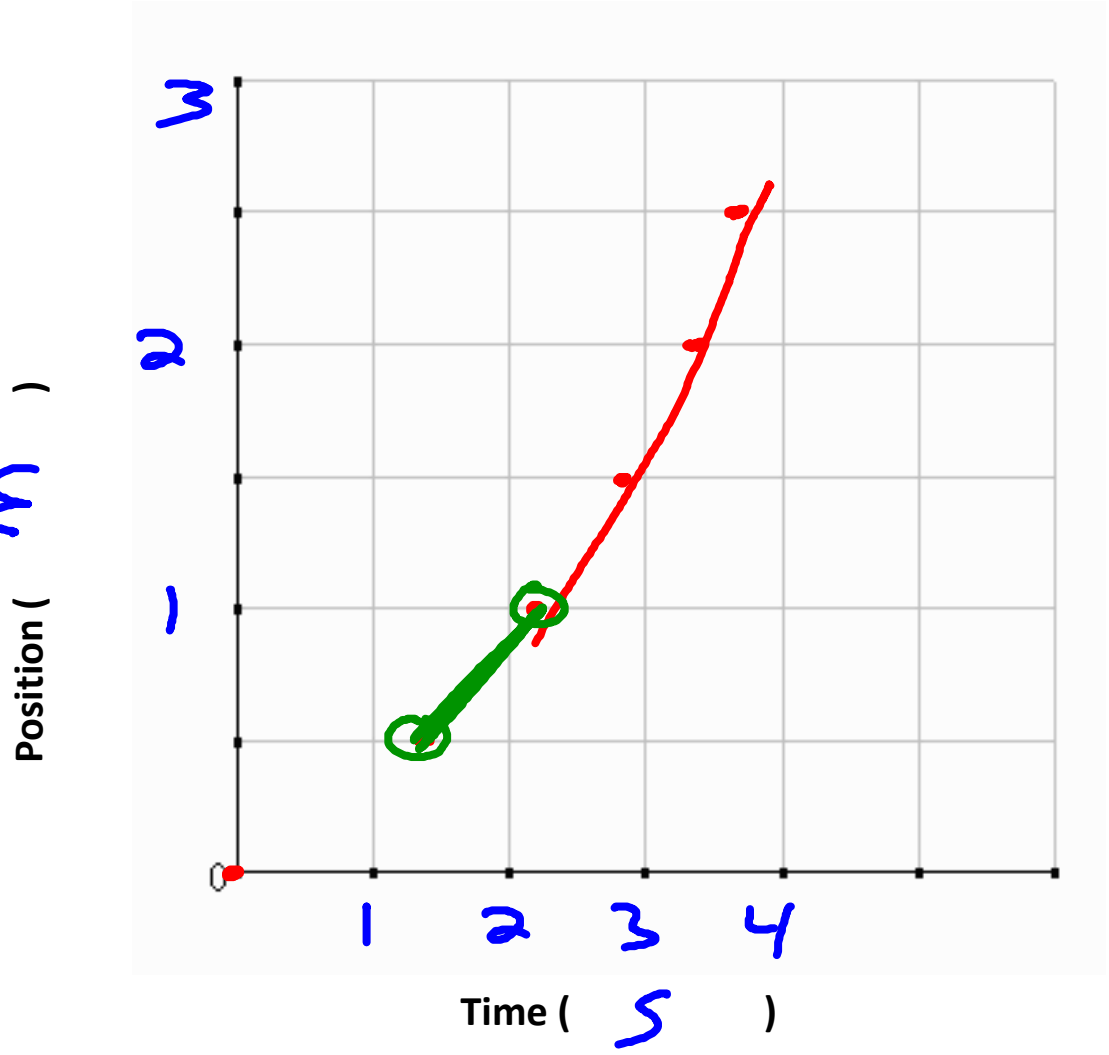
# Graphing, Slope, & Instantaneous Velocity

| Data Table | | | | | | |
|---|---|---|---|---|---|---|
| **Position** | .5m | 1m | 1.5m | 2 m | 2.5m | ~~3m~~ |
| **Time** | 1.43s | 2.21s | 2.85s | 3.38s | 3.61s | ~~X~~ |

**Position vs. Time Graph**



**Slope**

Formula

$\Delta$ = change in

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{(y_f - y_i)}{(x_f - x_i)}$$

*What does the slope of a position vs. time graph tell us?*

$$\frac{\text{distance}}{\text{time}} \rightarrow \underline{\text{velocity}}$$

**Average Velocity**

Formula

$$v_{avg} = \frac{\text{total distance}}{\text{total time}}$$

*What is the average velocity for our graph?*

$$v_{avg} = \frac{2.5\text{m}}{3.6\text{s}} = \boxed{0.69\ \text{m/s}}$$

**Instantaneous Velocity**

The exact velocity at any specific time.

Can be calculated using the slope of a position-time graph.

<u>Formula</u>

$$v_{inst} = \frac{\Delta d}{\Delta t} = \frac{d_f - d_i}{t_f - t_i}$$

*What was the instantaneous velocity at time* 2s *?*

$$v_{inst} = \frac{(1m - 0.5m)}{(2.21s - 1.43s)} = \boxed{0.64 m/s}$$