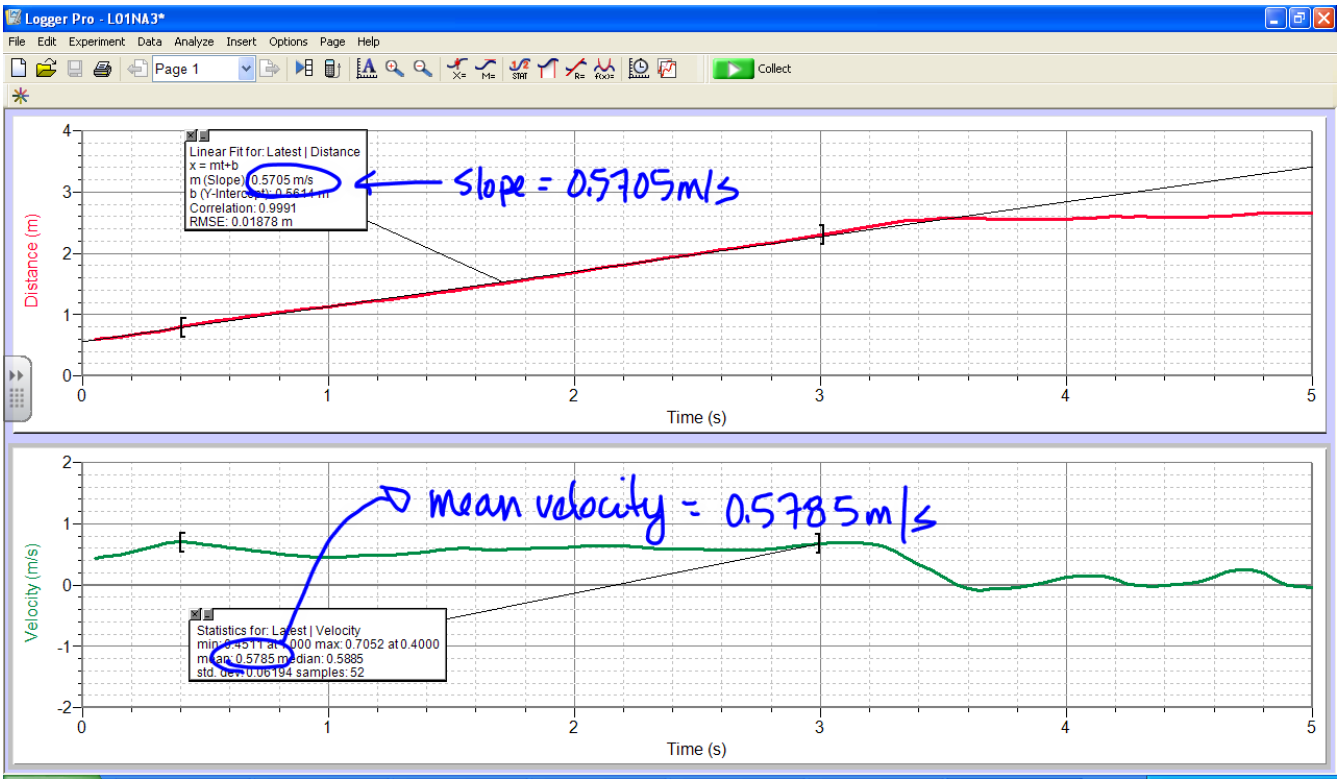
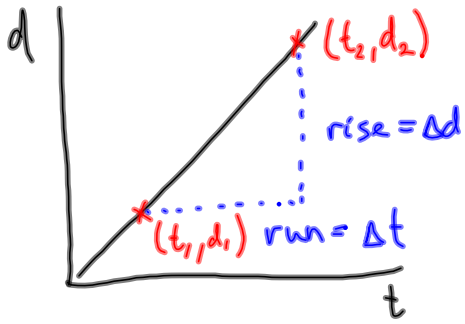

Logger Pro - L01NA3*
File Edit Experiment Data Analyze Insert Options Page Help
Page 1
Collect
Linear Fit for: Latest | Distance
x = mt+b
m (Slope): 0.5705 m/s
Correlation: 0.9991
RMSE: 0.01878 m
slope = 0.5705m/s
Distance (m)
Time (s)
mean velocity = 0.5785m/s
Statistics for: Latest | Velocity
mean: 0.5785 median: 0.5885
std. dev: 0.06194 samples: 52
Velocity (m/s)
Time (s)

Position-Time Graphs and Velocity

* Slope on d-t graph tells you two things:
  - direction of motion
  - how fast (i.e. speed)

} velocity

Constant Velocity



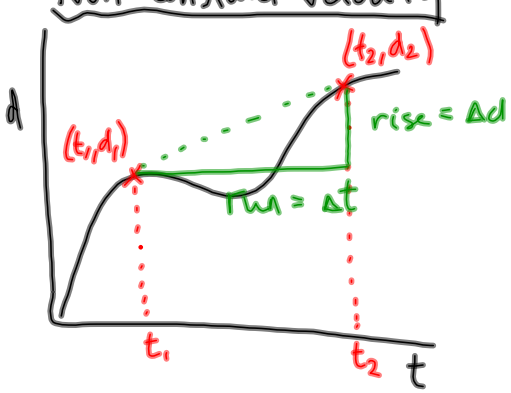
$$\text{Slope} = \frac{\text{rise}}{\text{run}}$$

$$\text{slope} = \frac{\Delta d}{\Delta t}$$

$$\text{slope}_{(d\text{-}t\ \text{graph})} = \text{velocity}.$$

$$\therefore \quad V = \frac{\Delta d}{\Delta t}$$

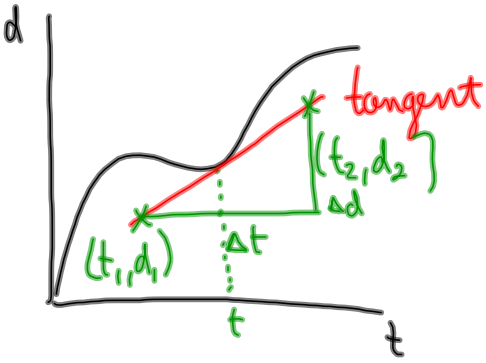
Non-Constant Velocity



$$\text{Slope} = \frac{\Delta d}{\Delta t}$$

$$V_{ave} = \frac{\Delta d}{\Delta t}$$

← average velocity is like finding the slope between two points on the graph



$$\text{Slope} = \frac{\Delta d}{\Delta t}$$

$$V_{inst} = \frac{\Delta d}{\Delta t}$$

instantaneous velocity is the slope of the tangent drawn at time t.

Some symbols + terms

Scalar - has only magnitude (size) 10km, 25s, 32L

vector - has both magnitude and direction 10 km [E]

95 $\frac{km}{h}$ [N32° W]

$\vec{d}$ - position - where the object is located in relation to a reference point.
(vector)

3.1 km [W]

Δd - distance - how far the object has moved
(scalar)

200 m

$\Delta\vec{d}$ - displacement - change in position $(\vec{d}_2 - \vec{d}_1)$
(vector) - Where the object is now in relation to where it started.

25 km [W]

v - speed - how fast
(scalar) - the rate at which the distance is covered.

100 $\frac{km}{h}$

$\vec{v}$ - velocity - the rate of change in position.
(vector)

2.8 m/s [N]

Speed: $v = \frac{\Delta d}{\Delta t}$ ← distance

* use distance when working out speed.

Velocity: $\vec{v} = \frac{\Delta\vec{d}}{\Delta t}$ ← displacement

* use displacement when finding velocity

Velocity and speed are NOT the same.

Rearrange: for Δd $v = \frac{\Delta d}{\Delta t}$

$v\Delta t = \Delta d$

$\Delta d = v\Delta t$

Rearrange for Δt: $v = \frac{\Delta d}{\Delta t}$

$\frac{v\Delta t}{v} = \frac{\Delta d}{v}$

$\Delta t = \frac{\Delta d}{v}$