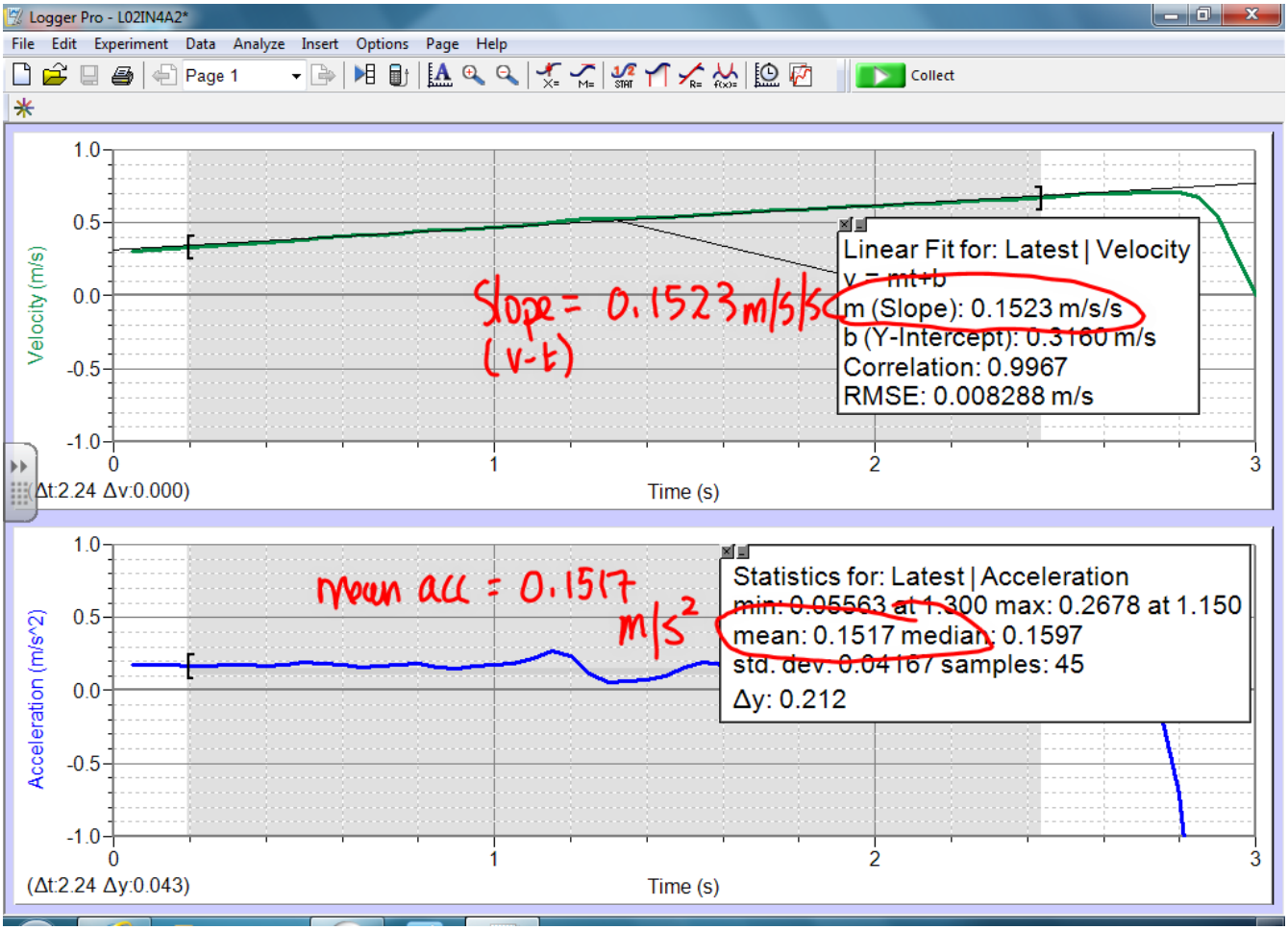
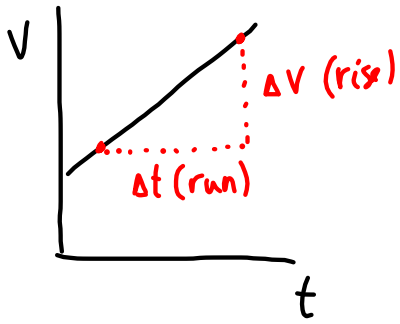

Logger Pro - L02IN4A2*
File Edit Experiment Data Analyze Insert Options Page Help
Page 1
Collect
Velocity (m/s)
Linear Fit for: Latest | Velocity
m (Slope): 0.1523 m/s/s
b (Y-Intercept): 0.3160 m/s
Correlation: 0.9967
RMSE: 0.008288 m/s
Slope = 0.1523 m/s/s
(v-t)
(Δt:2.24 Δv:0.000)
Time (s)
Acceleration (m/s^2)
mean acc = 0.1517 m/s²
Statistics for: Latest | Acceleration
min: 0.05563 at 1.300 max: 0.2678 at 1.150
mean: 0.1517 median: 0.1597
std. dev. 0.04167 samples: 45
Δy: 0.212
(Δt:2.24 Δy:0.043)
Time (s)

Velocity-Time Graphs + Acceleration

Constant Acceleration:



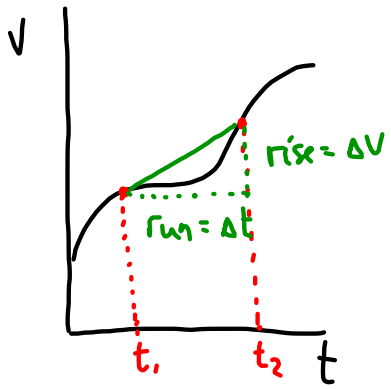
$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

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

From DEMO / INV5
we know that the slope(v-t) = acc.

$$\vec{a} = \frac{\Delta \vec{V}}{\Delta t}$$

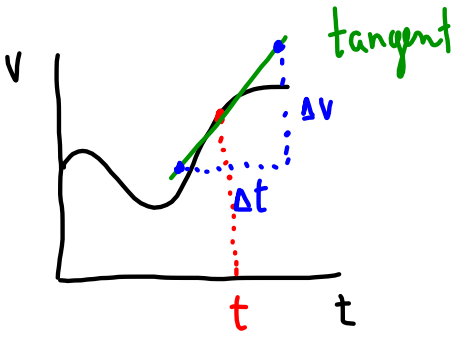
Non-Constant Acceleration:



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

$$\vec{a}_{ave} = \frac{\Delta \vec{V}}{\Delta t}$$

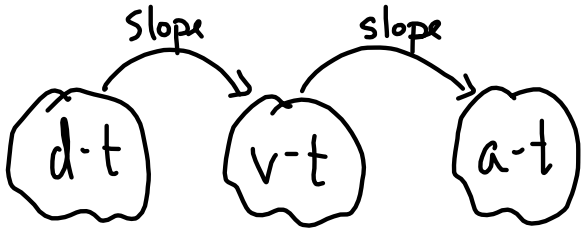
Average acceleration is the slope of the line joining t_1 and t_2



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

$$\vec{a}_{inst} = \frac{\Delta \vec{V}}{\Delta t}$$

Instantaneous Acceleration is the slope of the tangent drawn at time t



Acceleration Equation:

$$\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$$

$$\vec{a} = \frac{\vec{v}_2 - \vec{v}_1}{\Delta t}$$

MP|77

$\vec{a} = 5.2\,m/s^2$ [downhill]

$\Delta t = 8.5s$

$\vec{v}_1 = 0$

$\vec{v}_2 = ?$

$$\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$$

$$\vec{a} = \frac{\vec{v}_2 - \vec{v}_1}{\Delta t}$$

$$\vec{a}\Delta t = \vec{v}_2 - \vec{v}_1$$

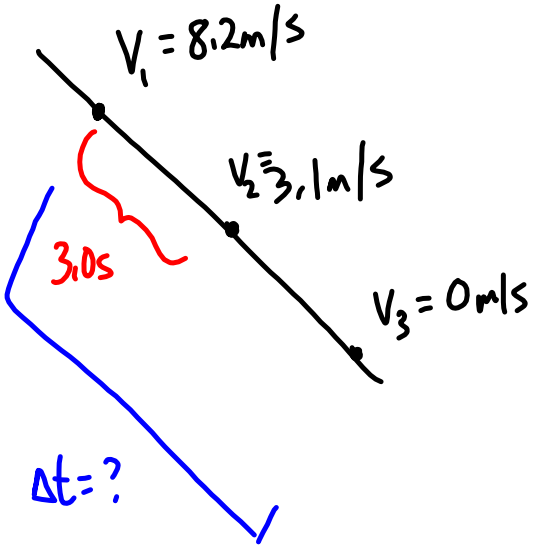
$$\vec{v}_2 = \vec{v}_1 + \vec{a}\Delta t$$

$$\vec{v}_2 = 0 + (5.2\,m/s^2\text{ [downhill]})(8.5s)$$

$\vec{v}_2 = 43\,m/s$ [downhill]

The final velocity is 43m/s [downhill]

MP|78



Find the acceleration:

$$\vec{a} = \frac{\Delta \vec{V}}{\Delta t}$$

$$\vec{a} = \frac{\vec{V}_2 - \vec{V}_1}{\Delta t}$$

$$\vec{a} = \frac{3.1 m/s\,[down] - 8.2 m/s\,[down]}{3.0 s}$$

$$\vec{a} = \frac{-5.1 m/s\,[down]}{3.0 s}$$

$$\vec{a} = -1.7 m/s^2\,[down]$$

Find the time (V_1 and V_3)

$$\vec{a} = \frac{\Delta \vec{V}}{\Delta t}$$

$$\vec{a}\,\Delta t = \Delta \vec{V}$$

$$\Delta t = \frac{\Delta \vec{V}}{\vec{a}}$$

$$\Delta t = \frac{\vec{V}_3 - \vec{V}_1}{\vec{a}}$$

$$\Delta t = \frac{0 - 8.2 m/s\,[down]}{-1.7 m/s^2\,[down]}$$

$$\frac{m}{s} \div \frac{m}{s^2}$$

$$\frac{\cancel{m}}{s} \times \frac{s^2}{\cancel{m}} = s$$

$$\Delta t = 4.8 s$$