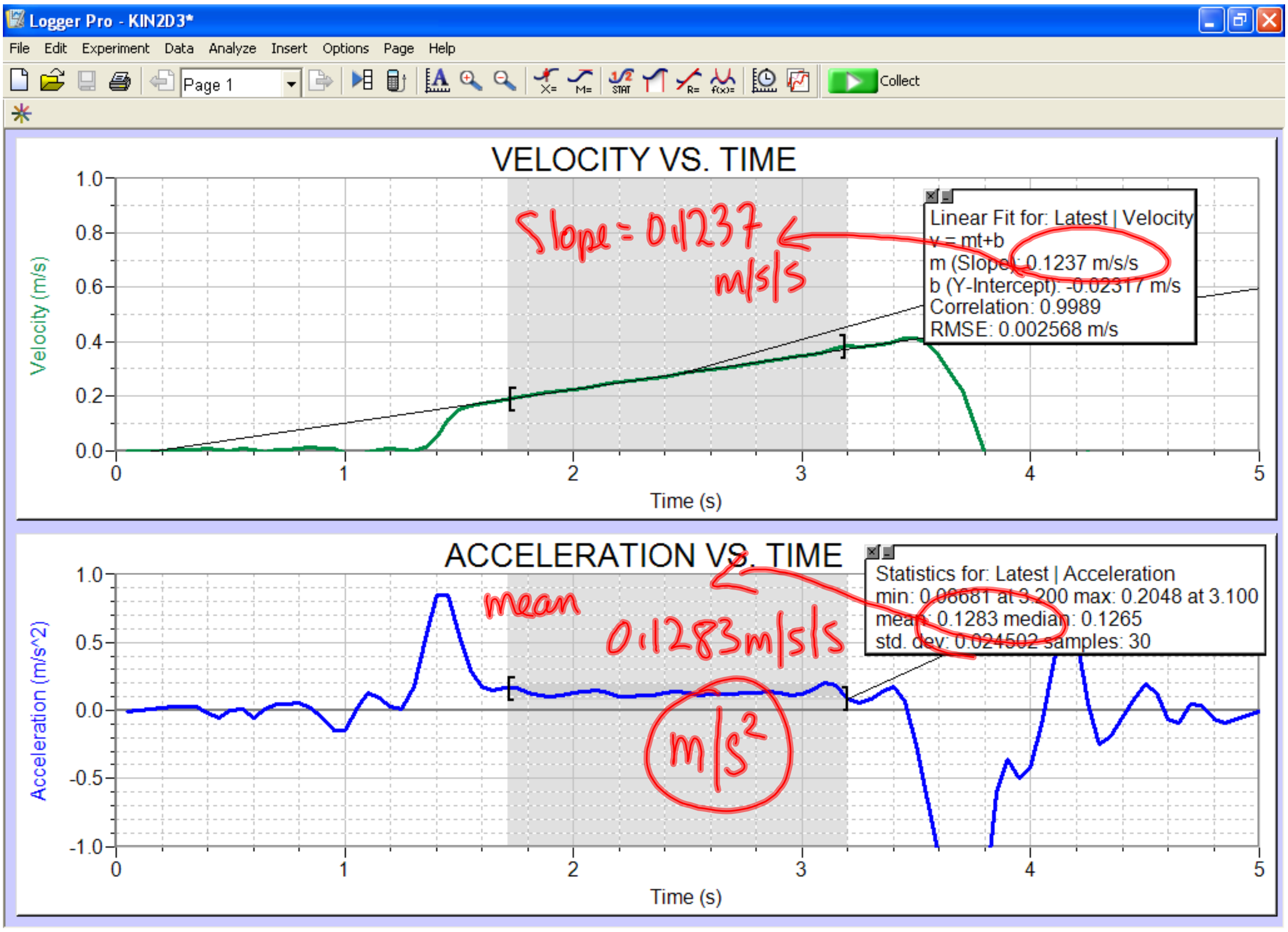


Slope = 0.1237 m/s/s

Linear Fit for: Latest | Velocity
v = mt+b
m (Slope): 0.1237 m/s/s
b (Y-Intercept): -0.02317 m/s
Correlation: 0.9989
RMSE: 0.002568 m/s

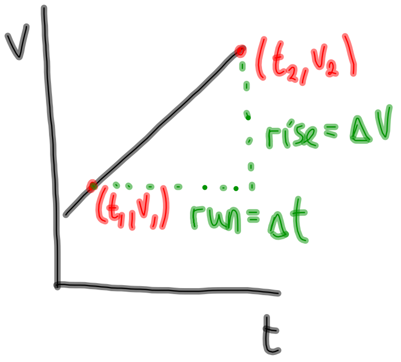
mean 0.1283 m/s/s

Statistics for: Latest | Acceleration
min: 0.08681 at 3.200 max: 0.2048 at 3.100
mean: 0.1283 median: 0.1265
std. dev: 0.024502 samples: 30

m/s^2

Acceleration & Velocity-Time Graphs

Constant Acceleration



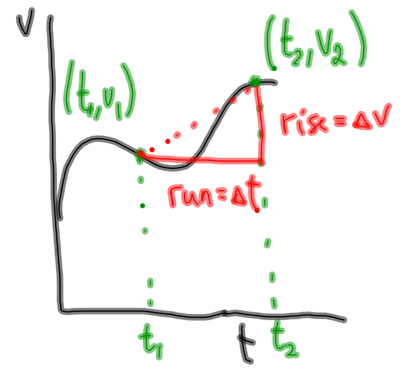
$$\text{Slope} = \frac{\text{rise}}{\text{run}}$$

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

Also: slope = acceleration (see Logger Pro graph)

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

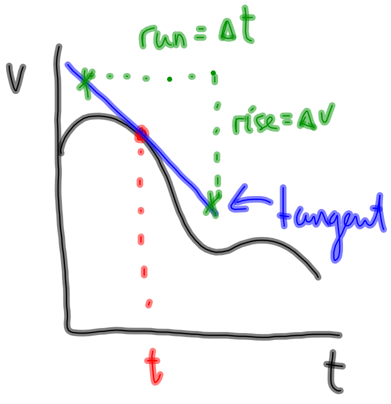
Non-Constant Acceleration



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

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

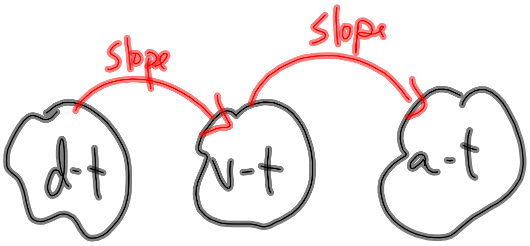
Average Acceleratio is the slope of the lin joining two point on v-t gra



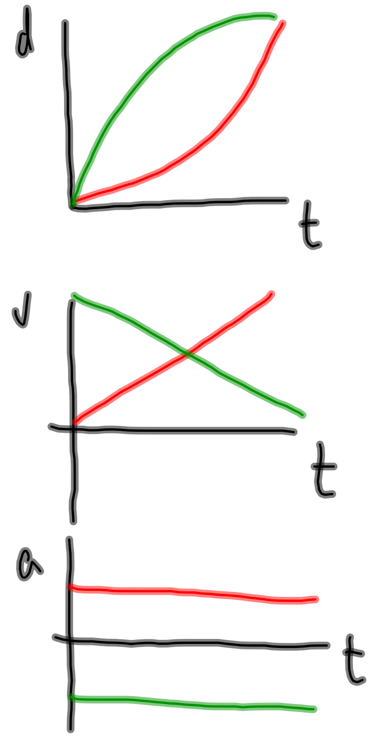
$$\text{slope} = \frac{\Delta v}{\Delta t}$$

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

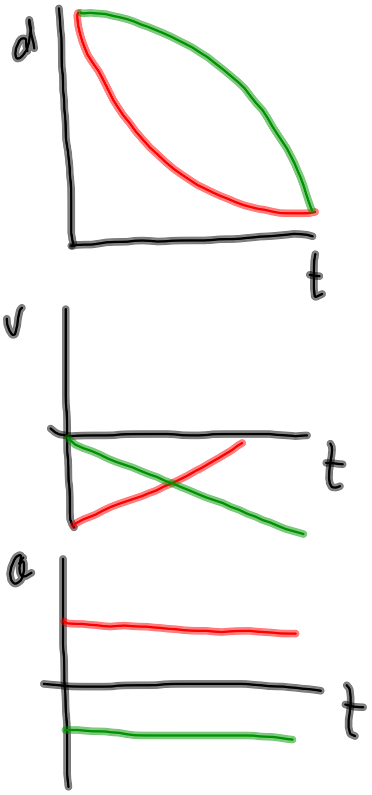
Instantaneous Acceleration is the slope of the tangent drawn at t on a v-t grap



Kinematics Graphs



- speeding ⊕ up steadily going ⊕ away (+acc)
- slowing ⊖ down steadily going ⊕ away (−acc)



- Steadily slowing ⊖ down going ⊖ towards (+acc)
- Steadily speeding ⊕ up going ⊖ towards (−acc)

MP|77

$\vec{v}_1 = 0\text{ m/s (implied)}$

$\vec{v}_2 = ?$

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

$\Delta t = 8.5\text{ s}$

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

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

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

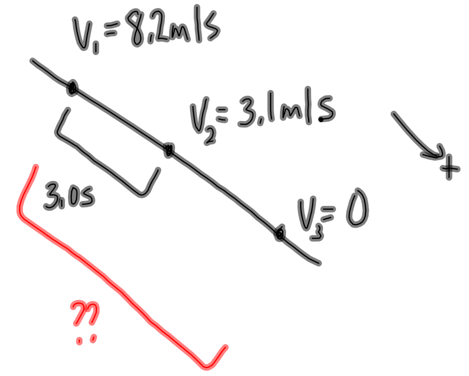
$$\boxed{\vec{v}_2 = \vec{v}_1 + \vec{a}\Delta t}$$

$$\vec{v}_2 = \cancel{0}\text{ m/s} + \left(5.2\,\frac{\text{m}}{\cancel{\text{s}}^2}\text{[downill]}\right)(8.5\,\cancel{\text{s}})$$

$$\vec{v}_2 = 44.2\,\frac{\text{m}}{\text{s}}\text{ [downhill]}$$

$$\boxed{\vec{v}_2 \doteq 44\,\frac{\text{m}}{\text{s}}\text{ [downhill]}}$$

mp|78



Find the acceleration:

(downhill is ⊕)

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

$$a = \frac{v_2 - v_1}{\Delta t}$$

$$a = \frac{3.1 m/s - 8.2 m/s}{3.0 s}$$

$$a = \frac{-5.1 m/s}{3.0 s}$$

$$a = -1.7 m/s^2$$

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

* acceleration is constant.

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

$$a = \frac{v_2 - v_1}{\Delta t}$$

$$a \Delta t = v_2 - v_1$$

$$\Delta t = \frac{v_2 - v_1}{a}$$

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

$$\boxed{\Delta t = 4.8 s}$$

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

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

$$= s$$

TO DO

① p73|24 + 25 (do not calc V_{ave} for #25)

② PP|80

③ Chapter 2 and Chapter 3 (up to p80) - READ

④ Calculator Pad Questions.