Acceleration

Acceleration is the rate of change of velocity. If an objects speed and/or direction changes, then it has acceleration.

Acceleration is the slope on a v-t graph:

linear v-t graph → constant slope → constant acc

non-linear v-t graph → non-constant slope → average acc
→ instantaneous acc.

Acceleration Equation: $\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$

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

PP/80

2. $\vec{v}_1 = 4.0\text{ m/s [downhill]} = +4.0\text{ m/s}$ (+)

$\vec{v}_2 = 3.5\text{ m/s [uphill]} = -3.5\text{ m/s}$

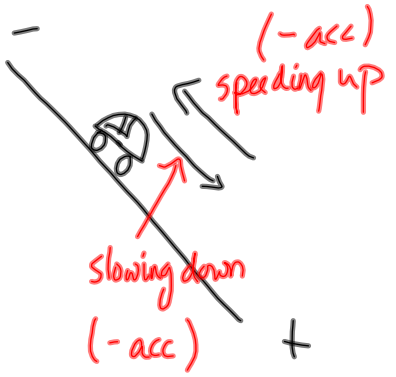
$\Delta t = 3.0\text{ s}$

$\vec{a} = ?$

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

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

$$\vec{a} = \frac{-3.5\text{ m/s} - (+4.0\text{ m/s})}{3.0\text{ s}}$$



$$\vec{a} = \frac{-7.5\text{ m/s}}{3.0\text{ s}}$$

$$\vec{a} = -2.5\text{ m/s}^2$$

$\vec{a} = 2.5\text{ m/s}^2$ [uphill]

Test (Velocity + Acceleration)

- Chapters 2 and 3 (up to p80)
- INV 1, 2, 3, 4 + 5

Demos

- description ↔ d-t / v-t / a-t graph
- velocity: slope on d-t graph
  - constant velocity (graph is linear)
  - average velocity
  - instantaneous velocity

  } graph is not linear
- acceleration: slope on v-t graph
  - constant acceleration (graph is linear)
  - average acceleration
  - instantaneous acceleration

  } graph is not linear
- solve velocity problems $\left(v = \frac{\Delta d}{\Delta t}\right)$
- solve acceleration problems $\left(a = \frac{\Delta v}{\Delta t}\right)$
- terms (vector / scalar / distance / position / displacement / speed / velocity / acceleration)