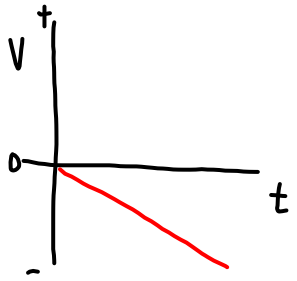
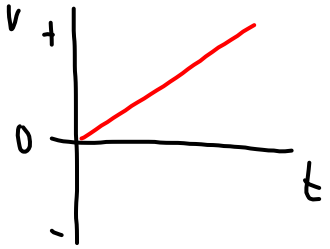
Velocity-Time Graphs

2. a)



going towards + speeding up steadily.

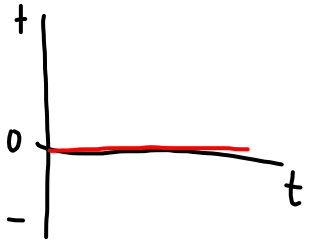
b)



going away + speeding up steadily

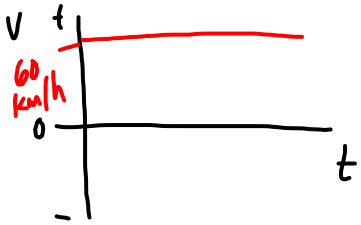
(doesn't make sense in the context of the trampoline)

c)

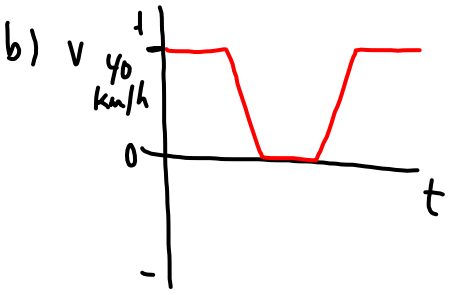


not moving

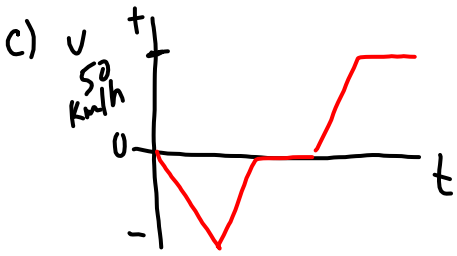
3. a)



b)



c)



QUIZ - Wednesday

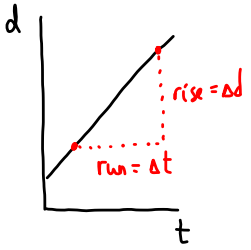
- d-t graph ⟷ description
- oil drop diagram ⟷ description (Name that Motion)
- calculate velocity from the slope of a d-t graph. (Investigation 2)

Position-Time Graphs & Velocity

(speed)

The slope on a position-time graph tells you how fast the object is travelling and the direction that it travels (i.e. velocity)

Consider an object travelling at constant (uniform) velocity:



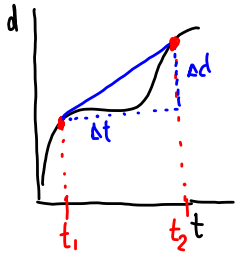
$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

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

from the previous DEMO, we know that slope (d-t) is equal to velocity

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

What if the velocity is not constant?

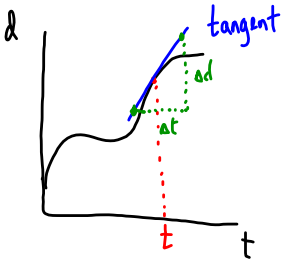


$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

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

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

Average velocity find the slope of the line between t_1 and t_2



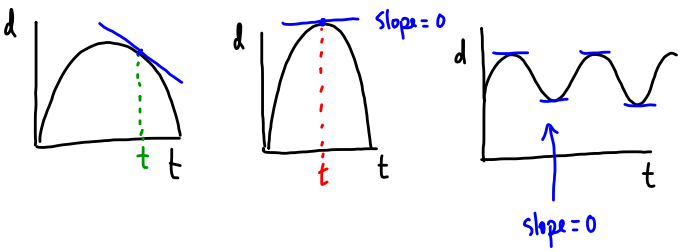
$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

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

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

Instantaneous velocity is the slope of the tangent at time t.

* you can only eyeball the tangent line
* Other ways
  - Calculus
  - technology (graphing calculator or Logger Pro)



Solving Velocity Problems

Velocity

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

Speed

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

DO NOT USE

$S = \frac{d}{t}$

Use GRASP to solve word problems:

G - Given

R - Required

A - Analysis

S - Solution

P - Paraphrase

Rearranging the equation:

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

$\Delta d = v \Delta t$

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

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