Cumulative Exam (Ch. 1-3) Review

- Prefixes (p. 6) for SI units
  - ex. micro- (10^{-6}) (μ) microgram (μg)
    - mu

- Significant Figures
  - ↳ Addition/Subtraction Rules
  - ↳ Multiplication/Division Rules

$1.000 \times 10^2 = 100.0$ (4 SF)

1. Nonzero digits are significant.
2. Final zeros after a decimal point are significant.
3. zeros between two significant digits are significant. (3 SF → 607)
4. Zeros used only as placeholders are not significant.

0.000111 1.11×10^{-4} 3100000 $= 3.1 \times 10^6$

Conversions

$10 \frac{m}{s} = 22.4 \frac{mi}{h}$

$$\frac{10\ m}{s} \cdot \frac{100\ cm}{1\ m} \cdot \frac{1\ in}{2.54\ cm} \cdot \frac{1\ ft}{12\ in} \cdot \frac{1\ mi}{5280\ ft} \cdot \frac{3600\ s}{1\ h}$$

Line-of-Best-fit

Scalar vs. vector

- magnitude
  - ↳ size
  - ↳ units
  - ↳ ex.
    - 16 m (distance)
    - 32°F (temp.)
    - 5.0 s (time)
    - 60 mph (speed)
- magnitude and direction
  - ↳ ex. +100 mph, North (velocity)
    - $-20\ m/s^2$ (acceleration)
    - -2.0 m (displacement)

position (d)

change in position

↳ displacement (Δd)

$$\Delta d = d_f - d_i$$

time interval (Δt)

$$\Delta t = t_f - t_i$$

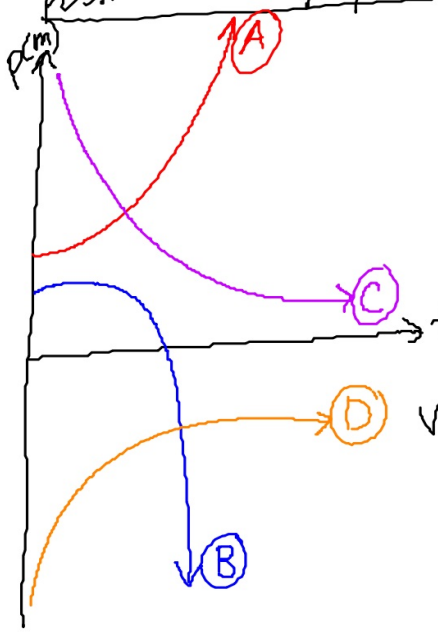
change in displacement over a time interval

↳ velocity

average velocity $\Rightarrow \bar{v} = \frac{\Delta d}{\Delta t}$

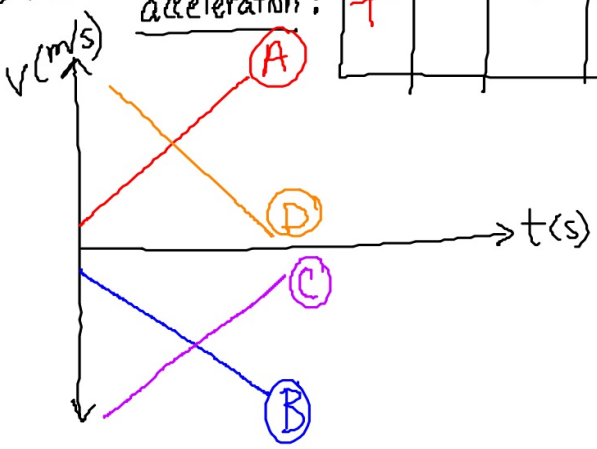
* speed = $\frac{\text{distance}}{\text{time}}$

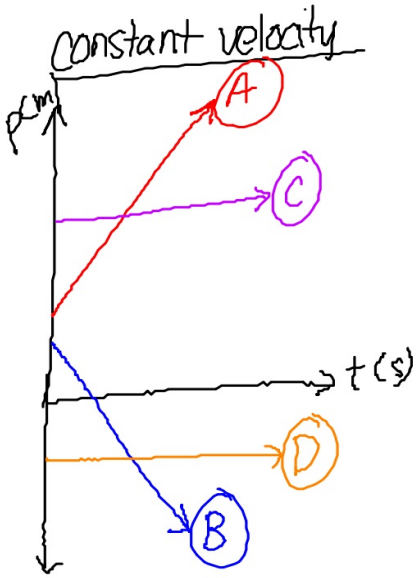
Position-time graphs

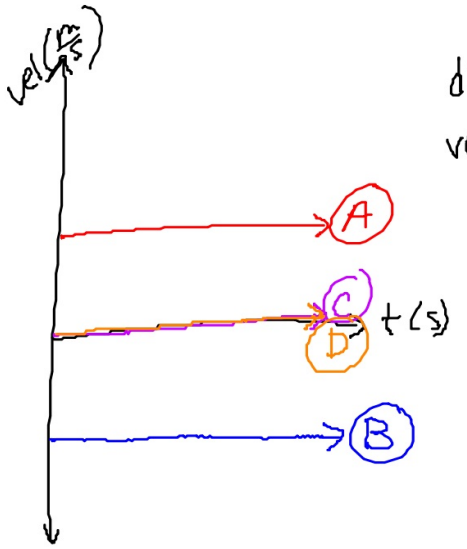


constant acceleration

	A	B	C	D
Direction:	+	−	−	+
Velocity:	+	−	−	+
Speeding up or slowing down:	↑	↑	↓	↓
acceleration:	+	−	+	−







	A	B	C	D
direction:	+	−	+	−
velocity:	+	−	∅	∅

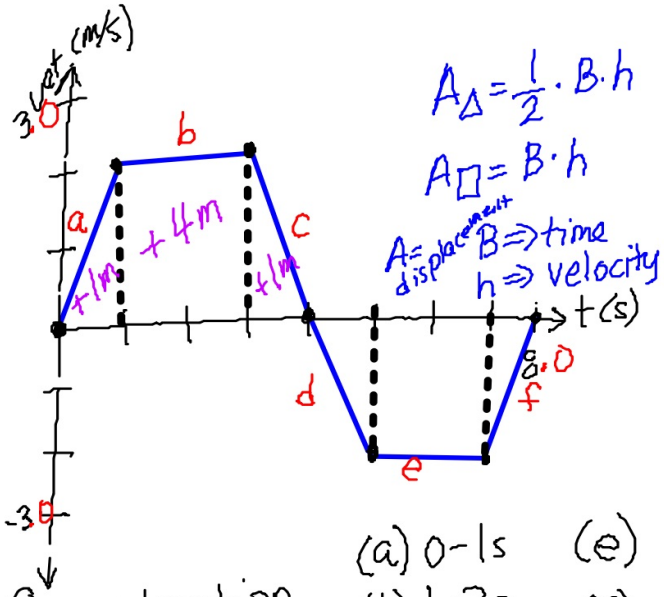
$$\bar{a} = \frac{\Delta V}{\Delta t} = \frac{V_f - V_i}{t_f - t_i}$$

⇓

average acceleration

Velocity-time graphs

1. direction
2. displacement ⇒ Area under curve
3. acceleration ⇒ slope
4. velocity
   - ↳ slowing down
   - ↳ speeding up
   - ↳ constant



$A_{\triangle} = \frac{1}{2} \cdot B \cdot h$

$A_{\square} = B \cdot h$

A = displacement, B ⇒ time, h ⇒ velocity

(1) acceleration

(2) displacement

(a) 0-1s
(b) 1-3s
(c) 3-4s
(d) 4-5
(e) 5-7
(f) 5-8

1 (a) $2.0 \frac{m}{s^2}$
(b) $0.0 \frac{m}{s^2}$
(c) $-2.0 \frac{m}{s^2}$
(d) $-2.0 \frac{m}{s^2}$
(e) $0.0 \frac{m}{s^2}$
(f) $2.0 \frac{m}{s^2}$

(a) $\frac{1}{2}(1s)(2\frac{m}{s}) = 1.0\,m$
(b) $(2s)(2\frac{m}{s}) = 4.0\,m$
(c) $(1s)(2)\frac{1}{2} = 1.0\,m$