HW Review

#1. $bpm_h = 95$ B/min.

David: $t_s = 242$ sec. $\Rightarrow$ $t_{Rec.} = 252$ sec.

Misha: $bpm_h = 82$ B/min

3 min 53 sec. $\rightarrow$ 322.5 sec.

236 sec.

Ayyan: $bpm_h = 70$ B/min.

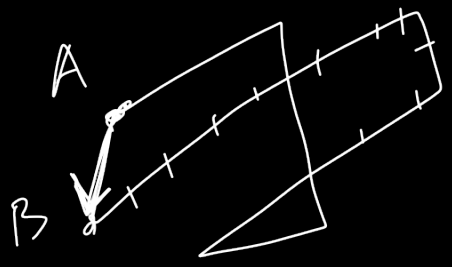
Jogi: $t_{h.} = 0.7$ sec.

$t_{song} = 218$ sec. $\rightarrow$ 295 beats.

Dalia $t_s = 175$ sec.

$bpm_h = 80$ B/min $\rightarrow$ 233 beats total.

#3.



$\rightarrow$ Jogi: 25 cm.

Dalia: 15.9cm

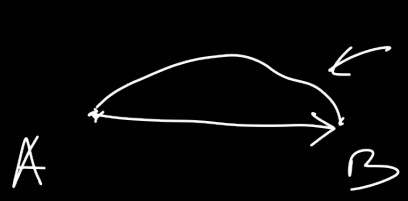
Ayyan: 16.3cm

David: 16.4 cm

Misha: 16.5cm

+1 1cm.

Speed and Velocity



$$\text{speed} = \frac{\text{distance}}{\text{time}} \Leftrightarrow \boxed{v = \frac{\ell}{t}}$$

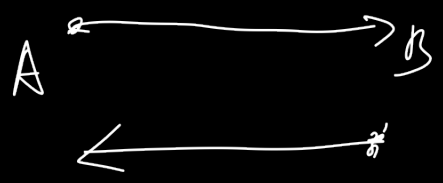
(instantaneous speed)

Units: mph, $\frac{m}{s}$, $\frac{km}{h}$, $\frac{km}{s}$.

$$\overrightarrow{\text{velocity}} = \frac{\overrightarrow{\text{displacement}}}{\text{time}} \Rightarrow \boxed{\vec{v} = \frac{\vec{d}}{t}}$$

Units: the same units!

$\vec{d} = \vec{10}\,m$. $t = 2s$.



$\vec{v} = 5\frac{m}{s}$ to the right.

v – magnitude of velocity.

For instantaneous velocity and speed:

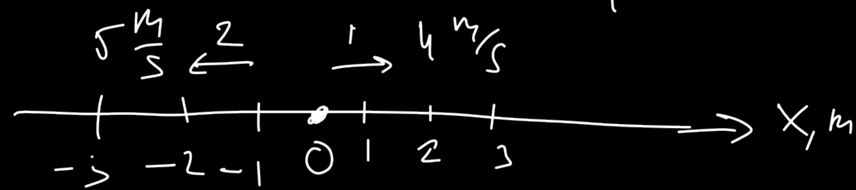
$$|\vec{v}| = v = 5\frac{m}{s}$$

Uniform motion: $\boxed{\vec{v} = \overrightarrow{const}}$

Rectilinear motion: $\vec{v} \parallel$ straight line.

$\vec{V}_1 = +4 \frac{m}{s}$

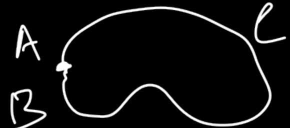
$\vec{V} = -5 \frac{m}{s}$



Nonuniform motion:
a) $v \neq$ const.
b) $\vec{v}$, direction changes.

$$\text{average speed} = \frac{\text{total distance}}{\text{total time}}$$

$$\overrightarrow{\text{average velocity}} = \frac{\overrightarrow{\text{total displacement}}}{\text{total time}}$$



$\ell = 1\,km.$

$t = 20\,min$

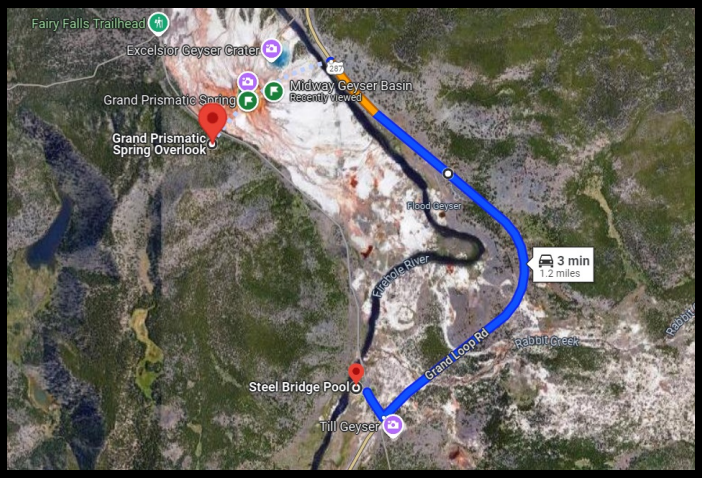
$\boxed{\text{av. } \vec{v} = \frac{\vec{0}\,m}{20\,min} = \vec{0}\,\frac{m}{s}}$

av. $v =$

$= \frac{1\,km}{20 \times 60\,sec.} \approx$

$= 0.83 \frac{m}{s}$

Problem 1.



start at a P. Lot.

Hiker → overlook, 1 km.

Biker → 4 km long

$$v_H = 4\ \frac{km}{h}\ ; \quad v_B = ?$$

$$v_B = \frac{\ell}{t} = \frac{4\ km}{t}$$

$$t = \frac{1\ km}{4\ km/h} = \frac{1}{4}\ h = 15\ min$$

$$v_B = \frac{4\ km}{1/4\ h} = 16\ \frac{km}{h}$$