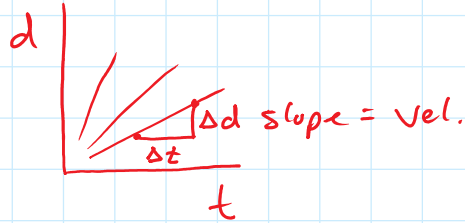


Kinematics II

Tuesday, September 12, 2017 9:30 AM

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



ex A car travels at 30m/s for 45s, how far did it go?

$$v = 30\text{m/s} \quad (t) v = \frac{\Delta d(t)}{t} \quad d = v \cdot t$$

$$t = 45\text{s} \quad (45\text{s}) 30\text{m/s} = \left(\frac{d}{45\text{s}}\right) 45\text{s}$$

$$d = ? \quad 1350\text{m} = d$$

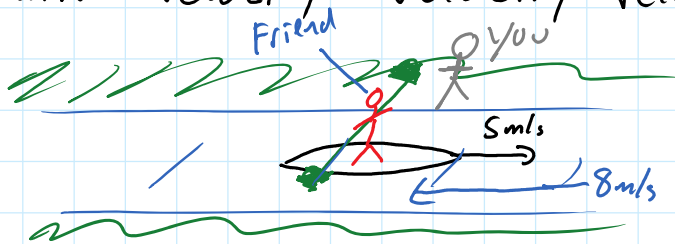
ex How long to run 3km @ 5m/s?

$$v = 5\text{m/s} \quad v = \frac{d}{t} \quad t = \frac{3000\text{m}}{5\text{m/s}}$$

$$d = 3\text{km} = 3000\text{m} \quad (t) 5 = \frac{3000}{t} \quad = 600\text{s} = 10\text{min}$$

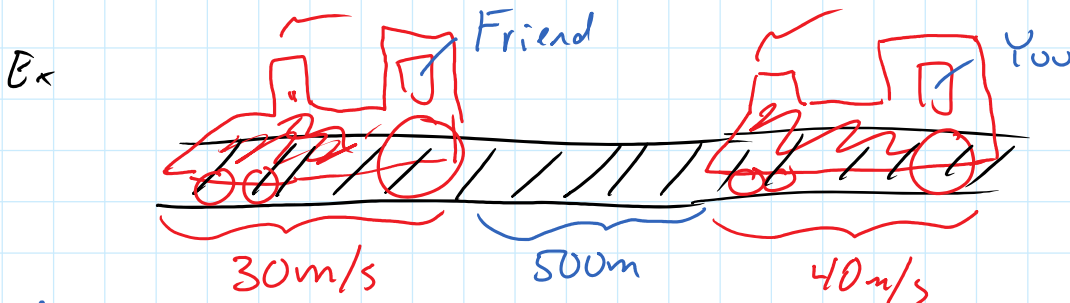
$$t = ?$$

Relative Velocity: velocity relative to a 2nd object.



Paddle at 5m/s [E] (still water)
Current is flowing at 8m/s [W]

Friend has a velocity of 3m/s [W] relative to you.



How long until you catch up to Friend

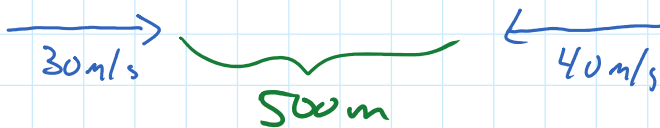
$$V_{rel} = 10 \text{ m/s}$$

$$d = 500 \text{ m}$$

$$t = ?$$

$$V = \frac{d}{t}, \quad t = \frac{d}{V} = \frac{500 \text{ m}}{10 \text{ m/s}} = 50 \text{ s}$$

Trains are moving in opposite directions.



$$V_{rel} = 70 \text{ m/s}$$

$$V = \frac{d}{t}, \quad t = \frac{d}{V} = \frac{500 \text{ m}}{70 \text{ m/s}} = 7.1 \text{ s}$$

Ave Velocity: velocities are not always constant

$$110 \text{ km/h}, 30 \text{ km/h}$$

ex 80 km/h for 2 hrs = 160 km

100 km/h for 3 hrs = 300 km

120 km/h for $\frac{4 \text{ hrs}}{9 \text{ hrs}}$ = $\frac{480 \text{ km}}{940 \text{ km}}$

$$V_{ave} = \frac{\text{total displacement}}{\text{total time}}$$

$$= \frac{940 \text{ km}}{9 \text{ hrs}}$$

$$= 104 \frac{\text{km}}{\text{h}}$$

ex 80 km/h for 3 hrs = 240 km

120 km/h for 1 hr = $\frac{120 \text{ km}}{360 \text{ km}}$

$$V_{ave} = \frac{360 \text{ km}}{4 \text{ hrs}}$$

$$= 90 \frac{\text{km}}{\text{hrs}}$$

Hom. Finish Investigation
P. 45 #2

p. 47 # 5a, 6a

p. 58 # 9 (apply concepts)