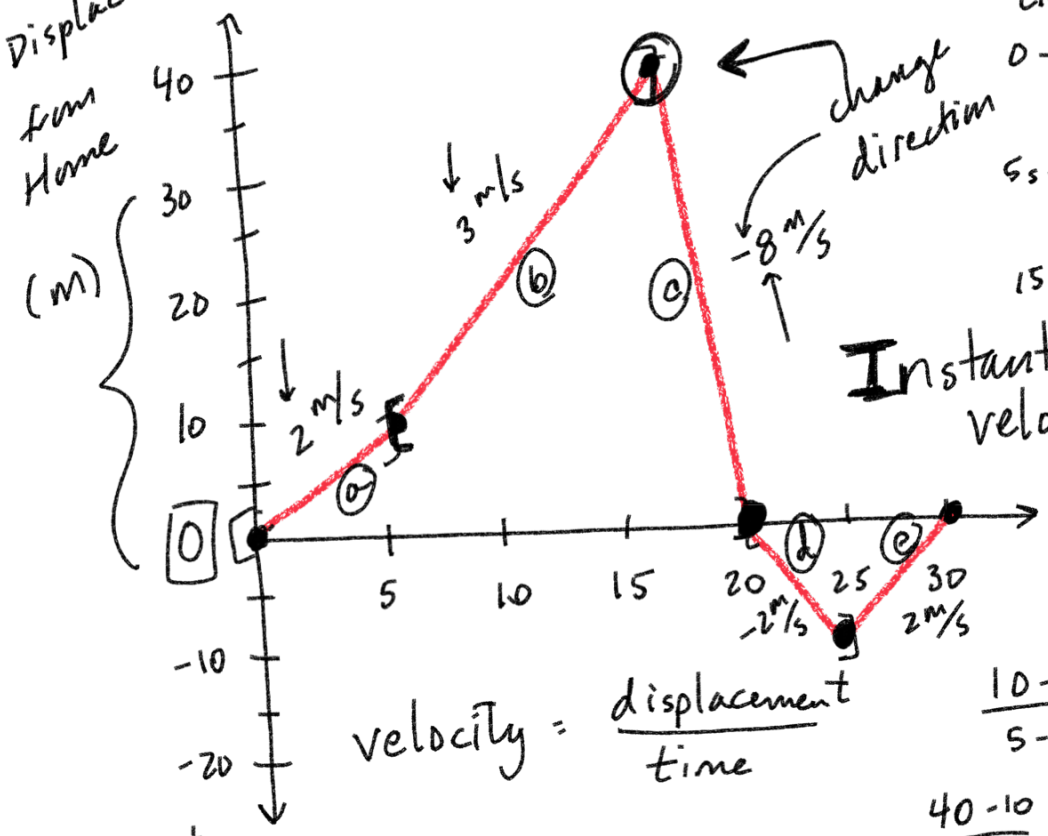
W-PS Physical Science Week 8

Displacement Vs Time



time	Displacement from Home
0 → 5s	0 → 10m (speeding up)
5s → 15s	10m → 40m speeding up
15s → 20s	40m → 0m speeding up after changing direction

Instantaneous velocity

velocity = $\frac{\text{displacement}}{\text{time}}$

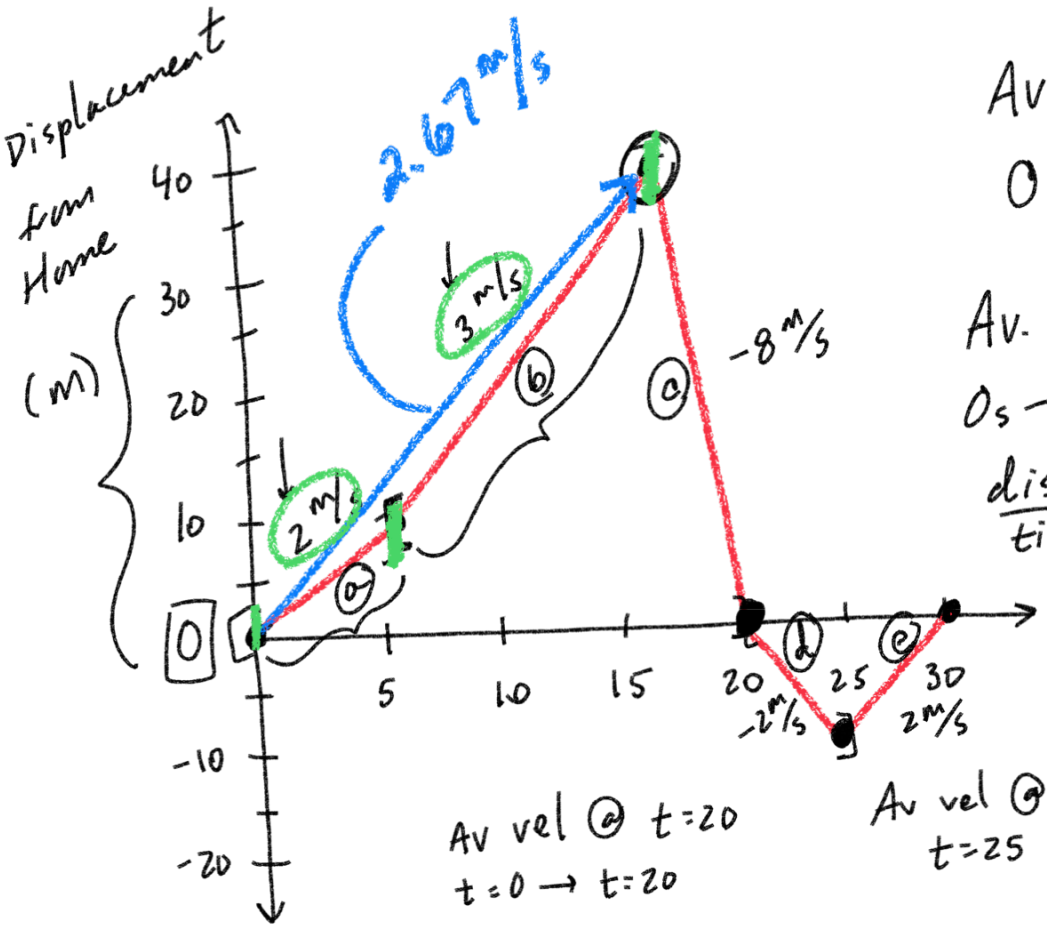
$\frac{10-0}{5-0} = \frac{10}{5} = 2\ m/s$

$\frac{40-10}{15-5} = \frac{30}{10} = 3\ m/s$

$\frac{0-40}{20-15} = \frac{-40}{5} = -8\ m/s$

$\frac{0-(-10)}{30-25} = \frac{10}{5} = 2\ m/s$

$\frac{-10-0}{25-20} = \frac{-10}{5} = -2\ m/s$



Average Velocity

$0s \longrightarrow$ =

Av. Velocity $\bar{v}$

$0s \rightarrow 15s$

$\frac{\text{disp}}{\text{time}}$ $\frac{40m - 0m}{15s - 0s}$

$\frac{40}{15} = \frac{8}{3}$

$2.67\ m/s$

Av vel @ $t = 20$

$t = 0 \rightarrow t = 20$

Av vel @ $t = 25$

miles 60mi 120mi 160mi

$\frac{160mi}{3h} = 53.3\ mi/h$

Av. velocity throughout trip

hrs 1 2 3

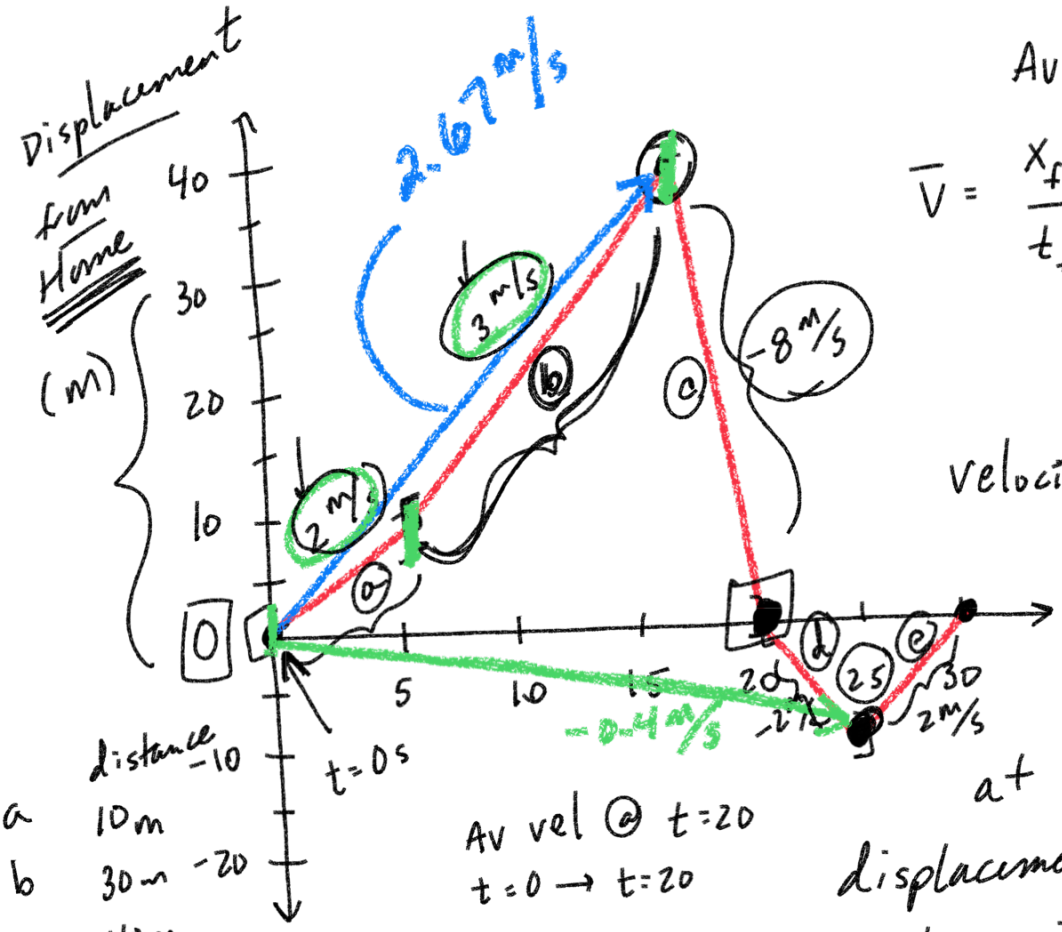
Velocity 60 mi/hr

60 mi/hr

$\frac{120 - 60}{2 - 1} = \frac{60}{1}$

$\frac{160 - 120}{3 - 2} = \frac{40}{1}$

40 mi/hr



Av velocity $t=20s$

$$\bar{V} = \frac{x_f - x_i}{t_f - t_i} = \frac{0m - 0m}{20s - 0s}$$

$$\frac{0m}{20s} = \boxed{0\ m/s}$$

velocity based on relative position

	distance	displacement
a	10m	
b	30m	-20
+ c	40m	
a → c	80m	

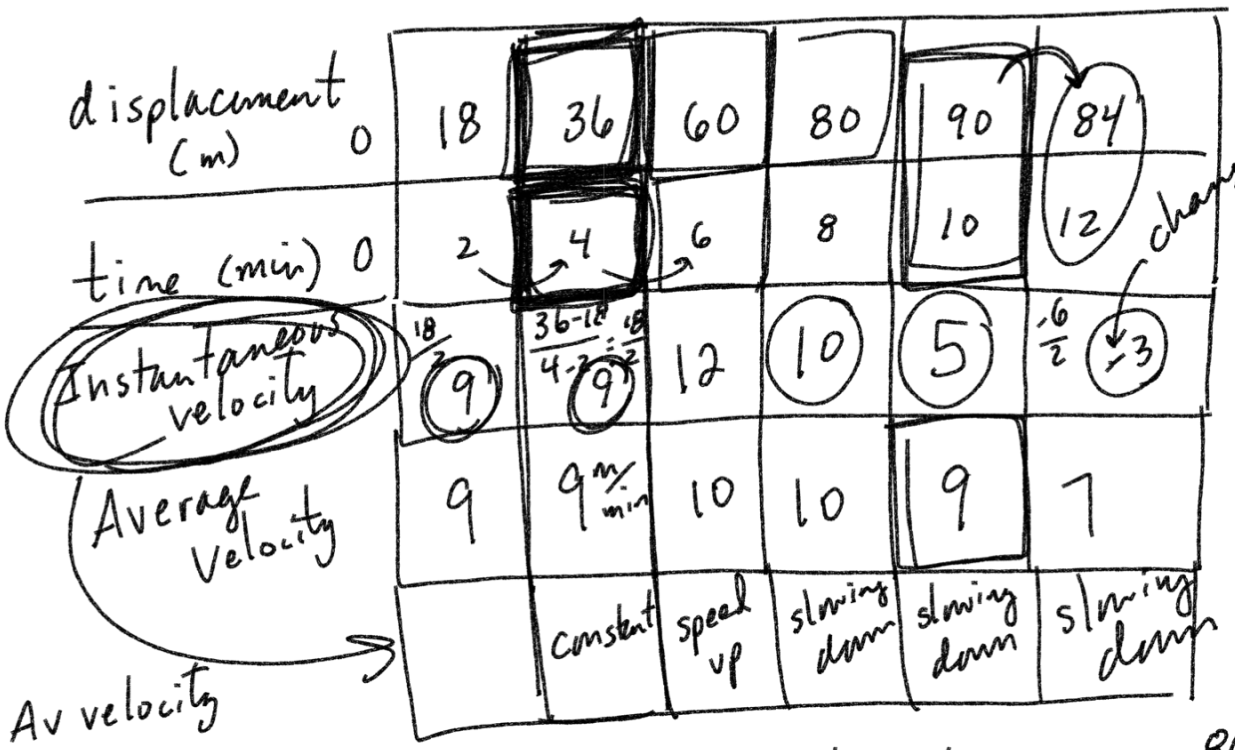
Av vel @ $t=20$
$t=0 \rightarrow t=20$

at 20s
displacement: 0m
distance: 80m
path length

$$\bar{V} = \frac{x_f - x_i}{t_f - t_i} = \frac{-10 - 0}{25 - 0} = \frac{-10}{25} = \boxed{-0.4\ m/s}$$

$$\text{Av speed} = \frac{\text{distance}}{\text{time}} = \frac{80m}{20s} = 4\ m/s$$

displacement (m)	0	18	36	60	80	90	84
time (min)	0	2	4	6	8	10	12
Instantaneous velocity		$\frac{18}{2} = 9$					
Average Velocity							



Av velocity

$$\frac{x_f - x_i}{t_f - t_i} = \frac{36-0}{4-0} = \frac{36}{4} = 9 \qquad \frac{60-36}{6-4} = \frac{24}{2} = 12 \qquad \frac{80-60}{8-6} = \frac{20}{2} = 10$$

$$\text{Av velocity} = \frac{x_f - x_i}{t_f - t_i} = \frac{60-0}{6-0} = \frac{60}{6} = 10 \qquad \frac{90-80}{10-8} = \frac{10}{2} = 5$$

$0 \rightarrow 6$

HW

Online HW 8 (Fri)

Quiz 8 (Fri)

Quiz 6 due tonight

Quiz 7 due Nov 4th

Quiz 8 (due Nov 11th)

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