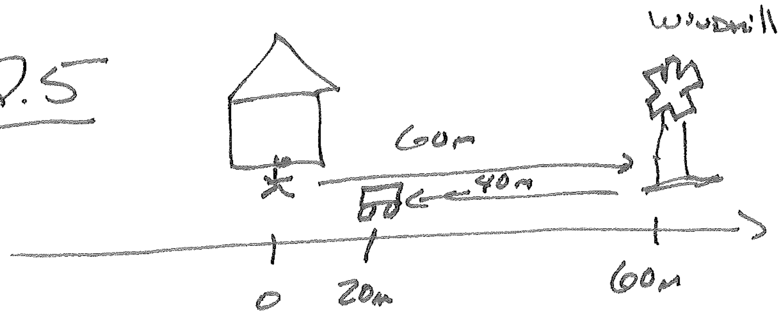
Physics 160,

Extra Credit #2

2.5



So Windmill is 60m to right of DOOR ⇒ X=0 at Door, X=60m For windmill

Bench is 40m ~~west~~ left of Windmill ⇒ 20m to right of DOOR ⇒ X=20m for Bench

For entire trip you end at Bench and start at DOOR ⇒ $X_2 = 20m$, $X_1 = 0$

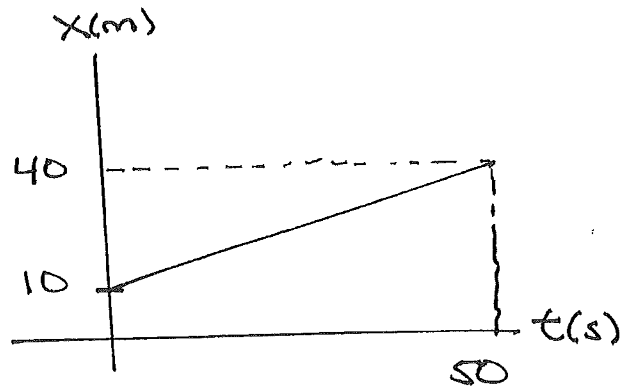
the entire elapsed time is $\Delta t_{TOTAL} = 28s + 36s = 64s$

$$V_{AV} = \frac{\Delta X}{\Delta t} = \frac{20m}{64s} = 0.3125 m/s = 0.313 m/s \text{ to 3 sig figs}$$

For entire trip, distance is $d = 60m + 40m = 100m$

$$SP_{AV} = \frac{d}{\Delta t} = \frac{100m}{64s} = 1.5625 m/s = 1.56 m/s \text{ to 3 sig figs}$$

WHAT X vs. t GRAPHS CAN TELL YOU:



a) WHAT IS TOTAL distance? $\Delta x = x_f - x_i$. JUST READ OFF VALUES

at $t_f = 50s$, $x_f = 40m$, at $t_i = 0$, $x_i = 10m$

$\Rightarrow \Delta x = 40m - 10m = 30m$

b) WHAT IS V_{av} FOR $\Delta t = 50s$? $V_{AV} = \frac{\Delta x}{\Delta t}$. Already have $\Delta x = 30m$

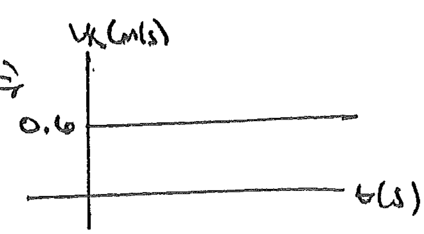
$\Rightarrow V_{AV} = \frac{30m}{50s} = 0.6 m/s$

c) WHAT IS V_x at $t = 10s$. X vs t is straight LINE $\Rightarrow$ UNIFORM MOTION

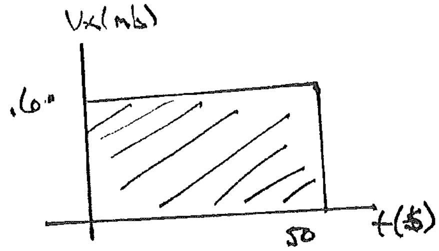
$\Rightarrow$ Constant Velocity. So $V_{AV} = V_x$ at all times $\Rightarrow V_x = 0.6 m/s$ too

d) Correct V_x graph? $\rightarrow$ Again, UNIFORM MOTION $\Rightarrow$ Constant V_x

$\Rightarrow$ HORIZONTAL V_x vs. t graph. $V_x = 0.6 m/s \Rightarrow$



Part E. → e)



Area = .6 m/s (50 s)

= 30 m

≤

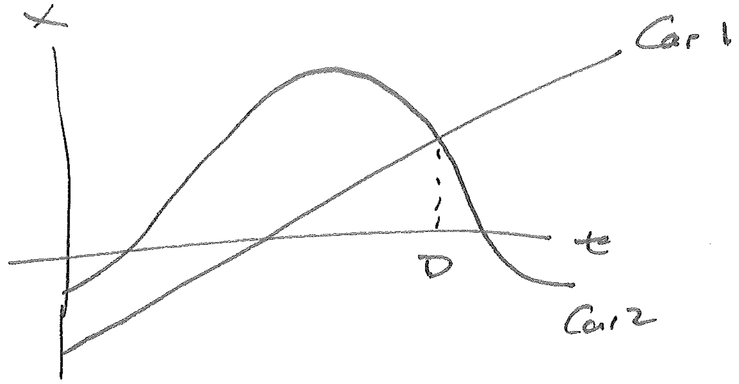
just verifying

That AREA UNDER

Vx PLOT IS EQUAL to

Δx

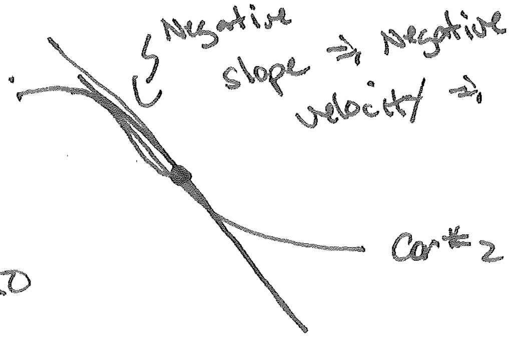
Analyzing Position vs. time Graphs



a) At what times do cars pass? to Pass, they have to be at same position. This is position vs. time ⇒ where two graphs cross at D

b) Are cars going in same direction? No. Velocity gives Direction of motion AND velocity is the slope of these curves.

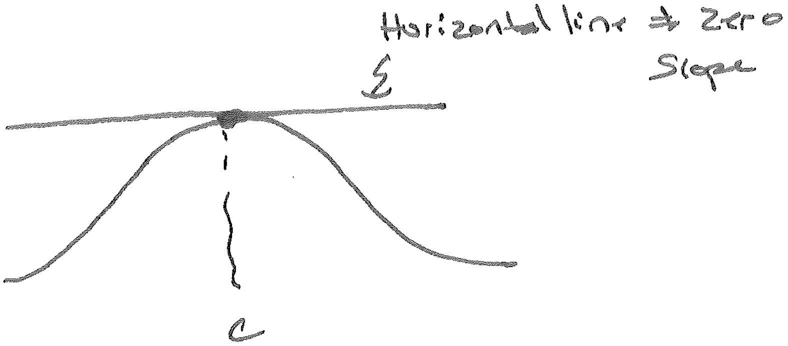
at D, Car #2's graph is sloping DOWNWARD.



Car #1 has constant positive slope ⇒ to the Right, the entire time.

Part C: #1 Never stops

d) When Does #2 stop? At C, the slope is zero



It might make more sense to you to just look at the graph: From start until C, Car #2 was increasing Position. From C onward, Position is decreasing. So at the turning Point, Car #2 must have switched direction ⇒ From positive to Negative ⇒ Zero velocity.

e) at what time are Cars moving with same velocity?

at A, the slope of Car 2's graph is closest to Car #1