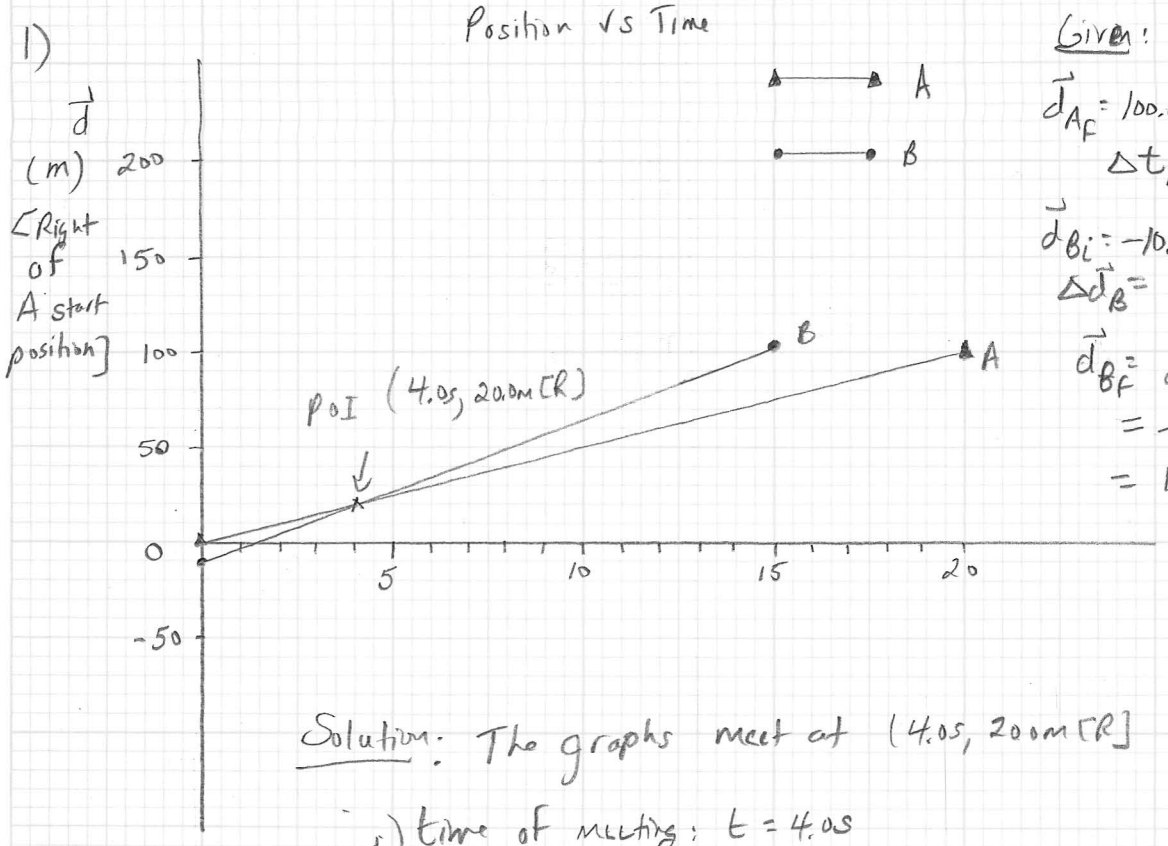
Displacement Text Questions

HW. pg 11 #1, pg 13 #6, 7.

1)



Given:

$\vec{d}_{A_F} = 100.0\text{m [R]}$ $\vec{d}_{A_i} = 0.0\text{m}$

$\Delta t_A = 20.0\text{s}$

$\vec{d}_{B_i} = -10.0\text{m [R]}$

$\Delta\vec{d}_B = 112.5\text{m [R]}$

$\vec{d}_{B_F} = \vec{d}_{B_i} + \Delta\vec{d}_B$

$= -10.0\text{m [R]} + 112.5\text{m [R]}$

$= 102.5\text{m [R]}$

Solution: The graphs meet at (4.0s, 20.0m [R]

i) time of meeting: $t = 4.0\text{s}$

ii) position, $\vec{d} = 20.0\text{m [R]}$ of origin

iii) $\Delta\vec{d}_B = \vec{d}_{BF} - \vec{d}_{Bi}$

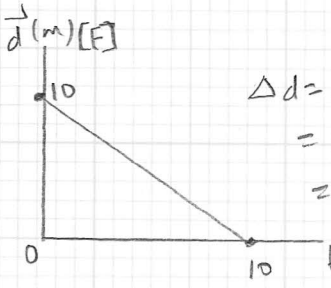
$= 20.0\text{m [R]} - (-10.0\text{m [R]})$

$= 30.0\text{m [R]}$

Pg 13.

6]

a)

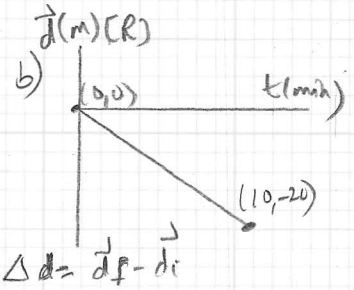


$\Delta d = \vec{d}_f - \vec{d}_i$

$= 0.0\text{m} - 10.0\text{m [E]}$

$= 10.0\text{m [B]}$

b)

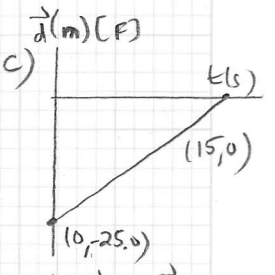


$\Delta d = \vec{d}_f - \vec{d}_i$

$= -20.0\text{m [R]} - 0.0\text{m}$

$= 20.0\text{m [L]}$

c)



$\Delta\vec{d} = \vec{d}_F - \vec{d}_i$

$= 0.0 - (-25.0\text{m})$

$= +25.0\text{m}$

$= 25.0\text{m [F]}$

b) No, displacement and final position do not have to have the same sign. In example 3, the person moves forward but their final position is at the origin.

7] $\Delta\vec{d} = 50.0\text{km [W]}$ W=+ $\Delta\vec{d} = \vec{d}_f - \vec{d}_i$

$\vec{d}_i = 5.0\text{km [E]}$

$\vec{d}_f = ?$

$\therefore \vec{d}_f = \Delta\vec{d} + \vec{d}_i = 50.0\text{km [W]} + 5.0\text{km [E]}$

$= 50.0\text{km} - 5.0\text{km}$

$= 45.0\text{km [W]}$

∴ Final position is 45.0km [W]