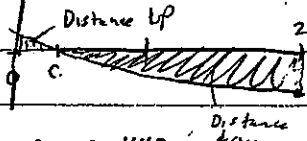
LESSON 2A HW Solutions BC: Q301 AB: Q303

HW #1] $v(t) = 1 - \tan^{-1}(e^t)$ $y(0) = -1$

$v(t) = 0$ at $t = 0.443$

GRAPH



$c = 0.443$

A] Total Distance $= \int_0^c v(t)\,dt - \int_c^2 v(t)\,dt = 0.454$ m

B] displacement $= \int_0^2 v(t)\,dt = -0.361$

Position $y(2) = y(0) + \int_0^2 v(t)\,dt$

$= -1 + \int_0^2 v(t)\,dt = -1.361$ m

C] Average velocity $= \dfrac{\int_0^2 v(t)\,dt}{2-0} = -0.180$ m/s

D] Average acceleration $= \dfrac{v(2)-v(0)}{2-0} = -0.325$ m/s^2

#2 AP 2011 $v(t) = 2\sin(e^{t/4}) + 1$ $v(t) = 0$ at $t = 5.196$

$a(t) = \frac{1}{2} e^{t/4} \cos(e^{t/4})$ $x(0) = 2$

a) $a(5.5) = +1.359$ and $v(5.5) = -0.453$

The particle is speeding up because $a(5.5)$ is the same sign as $v(5.5)$

b) average velocity $= \dfrac{\int_0^6 v(t)\,dt}{6-0} = 1.949$

c) Total distance $= \int_0^c v(t)\,dt = \int_c^6 v(t)\,dt = 12.573$

$c = 5.196$

d) PARTICLE CHANGES DIRECTION AT $t = 5.196$

Position $x(5.196) = x(0) + \int_0^{5.196} v(t)\,dt = 2 + \int_0^{5.196} v(t)\,dt = 14.135$

#3 2009 AP]

a) $a(7.5)$ = slope of velocity at $t = 7.5 = -0.1$

b) $\int_0^{12} |v(t)|\,dt$ represents Caren's total distance traveled.

$\int_0^{12} |v(t)|\,dt = \frac{1}{2}(2)(0.2) + \frac{1}{2}(2)(0.2) + \frac{1}{2}(1)(0.3) + 1(0.3)$

$+ \frac{1}{2}(0.3+0.2)(1) + 3(0.2) + \frac{1}{2}(1)(0.2) = 1.8$ miles

c) Caren turns around at $t = 2$. At this time she changes from moving in positive direction to moving in negative direction. i.e her velocity goes from positive to negative at $t = 2$. Also $v(2) = 0$

d)

Caren's net distance traveled $= \int_0^{12} v(t)\,dt = 1.4$ miles

Larry's net distance traveled $= \int_0^{12} w(t)\,dt = 1.6$ miles

so Caren lives closer to school.