HW 14 MATH 2501 Fall 2018

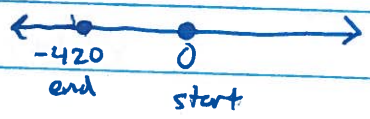
#224 $\begin{cases} v(t) = t^2 - 3t - 18 \\ 0 \le t \le 6 \end{cases}$

Displacement at time $t=6$: since position $= \int$ velocity,

Displacement(6) $= \int_0^6 v(t)\,dt = \frac{t^3}{3} - \frac{3}{2}t^2 - 18t \Big|_{t=0}^{t=6}$

$= \left(\frac{6^3}{3} - \frac{3}{2}(6^2) - 18(6)\right) - 0$

$= -420$ meters



#228 $a(t) = -9.8$, $r(0) = 1.5$, $v(0) = 40$

$\int a = v$ (i.e. $\int$ accel = velocity) and $\int v = r$ (i.e. $\int$ velocity = position)

So,

$v = \int a(t)\,dt = \int -9.8\,dt = -9.8t + C$

$40 = v(0) = -9.8(0) + C \Rightarrow 40 = C$

(40: given; $-9.8(0) = 0$: calculated)

Thus $\boxed{v(t) = -9.8t + 40}$

Now $r = \int v\,dt = -\frac{9.8}{2}t^2 + 40t + C_2$

$1.5 = r(0) = -\frac{9.8}{2}(0^2) + 40(0) + C_2$

(1.5: given; $-\frac{9.8}{2}(0^2) + 40(0) + C_2$: calculated; $0^2 = 0$, $40(0) = 0$)

$1.5 = C_2$

Thus position function is

$\boxed{r(t) = -\frac{9.8}{2}t^2 + 40t + 1.5}$