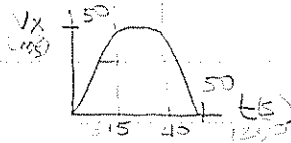


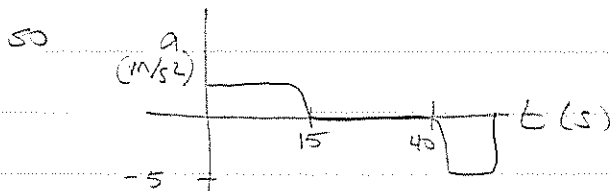
2. Ch. 2 P22



a) total area under graph = $(50 \text{ m/s})(40-15) + \frac{1}{2}(50 \text{ m/s})(15)$
 = total distance traveled + $\frac{1}{2}(50 \text{ m/s})(10) = 1875 \text{ m}$
 $\approx 1.9 \text{ km}$

b) between 10 + 40 s, area = total area - $\frac{1}{2}(50)(10) - \frac{1}{2}(33)(10)$
 $= 1460 \text{ m} \approx 1.5 \text{ km}$

c) from $t=0$ to $t=15$ s, $a \approx \text{constant} \approx \frac{\Delta v}{\Delta t} = \frac{50 \text{ m/s}}{15 \text{ s}} = +3.3 \text{ m/s}^2$
 from $t=15 \rightarrow 40$ s, $a \approx 0$ ($v \approx \text{const.}$)
 from $t=40 \rightarrow 50$ s, $a \approx \text{constant} \approx \frac{\Delta v}{\Delta t} = \frac{0-50 \text{ m/s}}{10 \text{ s}} = -5.0 \text{ m/s}^2$



d) i) $t=0 \rightarrow 15$ s: const. $a \Rightarrow X = X_i + v_i t + \frac{1}{2} a t^2$; take $X_i = 0$
 $= X_i + \frac{1}{2} (+3.3 \text{ m/s}^2) t^2 = 1.7 t^2$

ii) $t=15 \rightarrow 40$ s: const. $v \Rightarrow X = X_i + v t$; $v = 50 \text{ m/s}$ in m/s units
 $X_i = X$ at end of 15 s = $1.7(15)^2 = 380 \text{ m}$; $t = t$ after 15 s = $t-15$
 $\Rightarrow X = 380 + 50(t-15)$ in m/s units

iii) $t=40 \rightarrow 50$ s: const. $a \Rightarrow X = X_i + v_i t + \frac{1}{2} a t^2$
 $X_i = X$ at end of 40 s = $380 + 50(40-15) = 1630 \text{ m}$
 $a = -5.0 \text{ m/s}^2$

$v_i = v$ at end of 40 s = 50 m/s

$t = t$ after 40 s = $t-40$

$\Rightarrow X = 1630 + 50(t-40) - 2.5(t-40)^2$

e) $v_{x, \text{avg}} = \frac{\Delta X}{\Delta t} = \frac{1875 \text{ m}}{50 \text{ s}} = 37.5 \text{ m/s}$