Review

$100\ \text{km/h}\left(\frac{1000\ \text{m}}{1\ \text{km}}\right)\left(\frac{1\ \text{h}}{3600\ \text{s}}\right) = 27.8\ \text{m/s}$

6. $v_1 = 100\ \text{km/h}$

$v_2 = 0$

$a = -0.60\ \text{m/s}^2$

$\Delta t = ?$

$a = \frac{\Delta v}{\Delta t}$

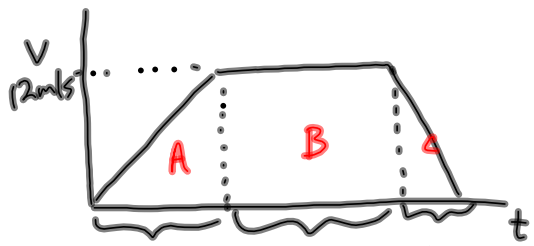
$a = \frac{v_2 - v_1}{\Delta t}$

$\Delta t = \frac{v_2 - v_1}{a}$

$\Delta t = \frac{0 - 27.8\ \text{m/s}}{-0.60\ \text{m/s}^2}$

$\Delta t = 46\ \text{s}$

8.



$\Delta t = 6.0\,s$ 30s 5s

$a = 2.0\,m/s^2$

$v_1 = 0$

$v_2 = ?$

$a = \frac{\Delta v}{\Delta t}$

$a = \frac{v_2 - v_1}{\Delta t}$

$a\Delta t = v_2 - v_1$

$v_2 = v_1 + a\Delta t$

$v_2 = 0 + (2.0\,m/s^2)(6.0s)$

$\boxed{v_2 = 12\,m/s}$

A - constant acceleration

$v_{ave} = \frac{\Delta d}{\Delta t}$

$\frac{v_1 + v_2}{2} = \frac{\Delta d}{\Delta t}$

$\Delta d = \left(\frac{v_1 + v_2}{2}\right)\Delta t$

$\Delta d = \left(\frac{0 + 12\,m/s}{2}\right)(6.0s)$

$\boxed{\Delta d = 36\,m}$

B - Constant Velocity

$v = \frac{\Delta d}{\Delta t}$

$\Delta d = v\,\Delta t$

$\Delta d = (12\,m/s)(30s)$

$\boxed{\Delta d = 360\,m}$

↑ uncertain

C - Constant Acceleration

$v_{ave} = \frac{\Delta d}{\Delta t}$

$\Delta d = v_{ave}\,\Delta t$

$\Delta d = \left(\frac{v_1 + v_2}{2}\right)\Delta t$

$\Delta d = \left(\frac{12\,m/s + 0}{2}\right) 5.0s$

$\boxed{\Delta d = 30\,m}$

A -> 36m

B -> 360 m

C -> 30 m

426 m $\Rightarrow 4.3 \times 10^2\,m$

Dynamics Review

Newton's Laws:

1- Law of Inertia

2- $\vec{F}_{net} = m\vec{a}$ $\left(a \propto F,\ a \propto \frac{1}{m}\right)$

3- Action-Reaction

$(\vec{F}_{AB} = -\vec{F}_{BA})$

Weight => $F_g = mg$ $(g = 9.81 m/s^2)$

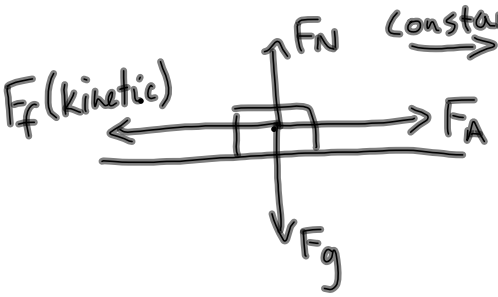
(force of gravity)

Friction => static + kinetic

Static: $F_f \leq \mu_s F_N$

kinetic: $F_f = \mu_k F_N$

FBD - Free Body Diagrams are ESSENTIAL !!



Since the velocity is constant

$F_A = F_f$

Since there is no motion vertically

$F_N = F_g$

F_N is ALWAYS perpendicular to the surface!!