Review

Weight → $F_g = mg$

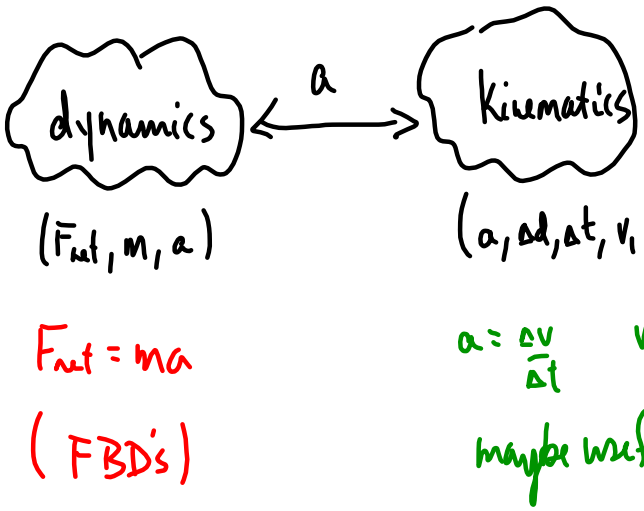
Friction → $F_f = \mu F_N$

FBD's!

Newton's Law

1. Law of Inertia
2. $\vec{F}_{net} = m\vec{a}$
3. ???

Combining Dynamics + Kinematics



MP|185

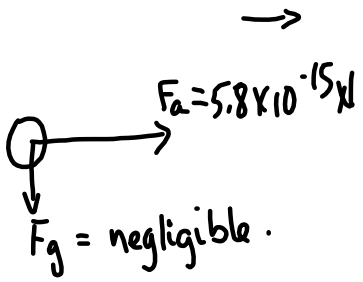
$m = 9.1 \times 10^{-31}\ kg$

$\Delta d = 3.5\ mm$

$F_a = 5.8 \times 10^{-15}\ N$

$v_1 = 0$

$v_2 = ?$



$\vec{F}_{net} = m\vec{a}$

$F_a = ma$

$(5.8 \times 10^{-15}\ N) = (9.1 \times 10^{-31}\ kg)\, a$

$a = 6.4 \times 10^{15}\ m/s^2$

$v_2^2 = v_1^2 + 2a\Delta d$

$v_2^2 = 0^2 + 2(6.4 \times 10^{15}\ m/s^2)(0.0035\ m)$

$v_2 \doteq 6.7 \times 10^6\ m/s$

MP|166

$\vec{F}_a = 9.50N\,[S]$

$m = 20.0kg$

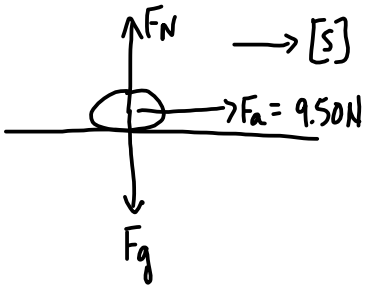
$\Delta t = 1.86s$

$v_1 = 0$

a) $\vec{a} = ?$

b) $\vec{v}_2 = ?$

frictionless



$\vec{F}_{net} = m\vec{a}$

$\vec{F}_a = m\vec{a}$

$\vec{a} = \frac{\vec{F}_a}{m}$ $\quad \frac{N}{kg} = \frac{kg \cdot m/s^2}{kg}$

a) $\vec{a} = \frac{9.50N\,[S]}{20.0kg}$

$\vec{a} = 0.475\ m/s^2\,[S]$

b) $\vec{a} = \frac{\Delta\vec{v}}{\Delta t}$

$\vec{a} = \frac{\vec{v}_2 - \vec{v}_1}{\Delta t}$

$\vec{a}\Delta t = \vec{v}_2 - \vec{v}_1$

$\vec{v}_2 = \cancel{\vec{v}_1}^{\,0} + \vec{a}\Delta t$

$\vec{v}_2 = (0.475 m/s^2\,[S])(1.86s)$

$\vec{v}_2 = 0.884\ m/s\,[S]$

TO DO

① PP|168

② Finish Popper Physics (#5)..... hint.... DRAW A FBD!