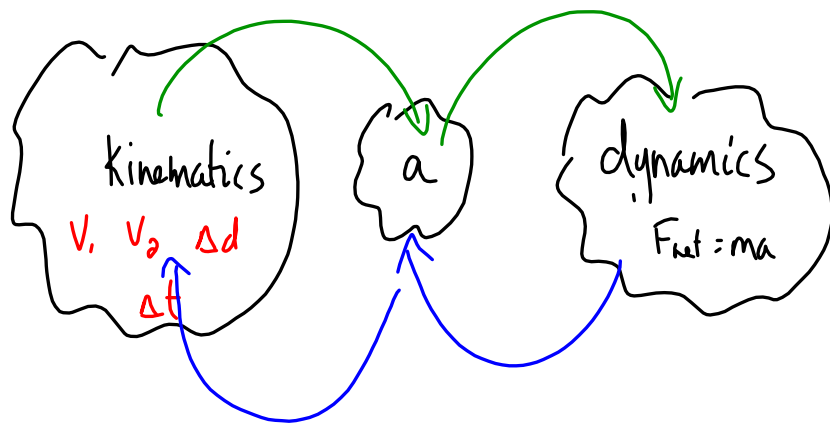


# Combining Kinematics and dynamics



MP1165

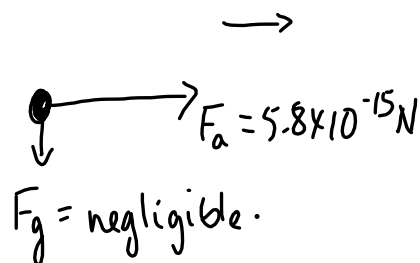
$$m = 9.1 \times 10^{-31} \text{ kg}$$

$$v_1 = 0$$

$$v_2 = ?$$

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

$$\Delta d = 3.5 \text{ mm}$$



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

$$F_a = ma$$

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

$$a = 6.37 \times 10^{15} \text{ m/s}^2$$

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

$$v_2^2 = 0^2 + 2(6.37 \times 10^{15} \text{ m/s}^2)(3.5 \times 10^{-3} \text{ m})$$

$$v_2 = 6.7 \times 10^6 \text{ m/s}$$

MP/166

$$\vec{F}_a = 9.50 \text{ N [s]}$$

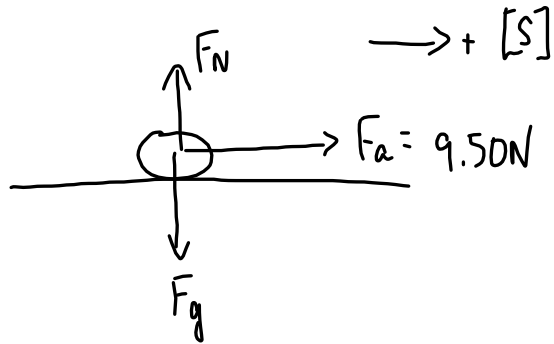
$$m = 20.0 \text{ kg}$$

$$\Delta t = 1.86 \text{ s}$$

$$v_1 = 0$$

$$a) \quad a = ?$$

$$b) \quad v_2 = ?$$



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

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

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

$$\vec{a} = \frac{9.50 \text{ N [s]}}{20.0 \text{ kg}}$$

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

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

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

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

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

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

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

TO DO:

PP/168