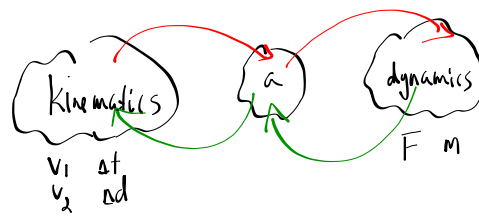


Combining Kinematics + Dynamics



b.

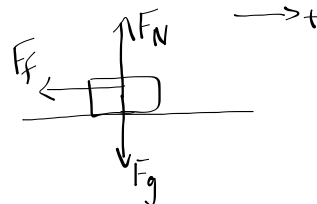
$$m = 1.2 \times 10^3 \text{ kg}$$

$$v_1 = 45 \text{ km/h} \quad (12.5 \text{ m/s})$$

$$v_2 = 0$$

$$d = 35 \text{ m}$$

$$m = ?$$



$a = ?$ ① Find the acceleration

$$v_2^2 = v_1^2 + 2ad$$

$$a = \frac{v_2^2 - v_1^2}{2ad}$$

$$a = \frac{0 - (12.5 \text{ m/s})^2}{2(35 \text{ m})}$$

$$a = -2.23 \text{ m/s}^2$$

② Find F_f :

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

$$-F_f = ma$$

$$F_f = -ma$$

$$F_f = (1.2 \times 10^3 \text{ kg})(-2.23 \text{ m/s}^2)$$

$$F_f = 2678.6 \text{ N}$$

③ Find μ :

$$F_f = \mu F_N$$

$$\mu = \frac{F_f}{F_N}$$

$$\mu = \frac{2678.6 \text{ N}}{(1.2 \times 10^3 \text{ kg})(9.8 \text{ m/s}^2)}$$

$$\mu = 0.23$$