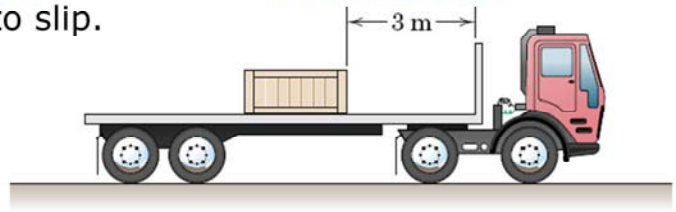
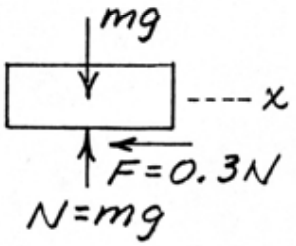
Rectilinear Motion: Exercise 3

The ***coefficient of static friction*** between the flat bed and crate it carries is ***0.30***.

Determine the minimum stopping ***distance s*** which the truck can have from a speed of ***70 km/h*** with constant ***deceleration*** if the crate is not to slip.



3/19 Let m = mass of crate



$\Sigma F_x = ma_x$; $-0.3mg = ma_x$

$a_x = -0.3g = -0.3(9.81) = -2.94\ m/s^2$

$\int_v^0 v\,dv = \int_0^s a_x\,dx$; $-\frac{v^2}{2} = a_x s$

$s = \frac{-(70/3.6)^2/2}{-2.94} = \underline{64.3\ m}$