

T = force on man by string

N3: force on string by man = $T = 465 \text{ N}$

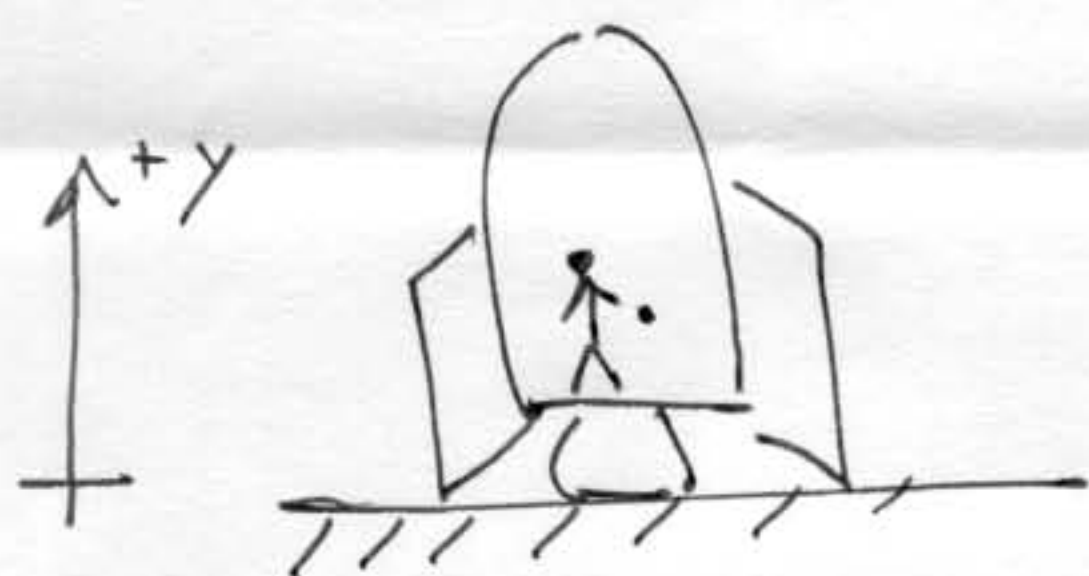
$$(b) \quad 2T - (m_m + m_c)g = (m_m + m_c)a$$

$$2T = (m_m + m_c)(g + a)$$

$$T = \frac{1}{2}(m_m + m_c)(g + a) = 527 \text{ N}$$

6(a) Work in coord system at rest, where we can use $F = ma$!

on earth



$$a_{\text{floor}} = 0$$

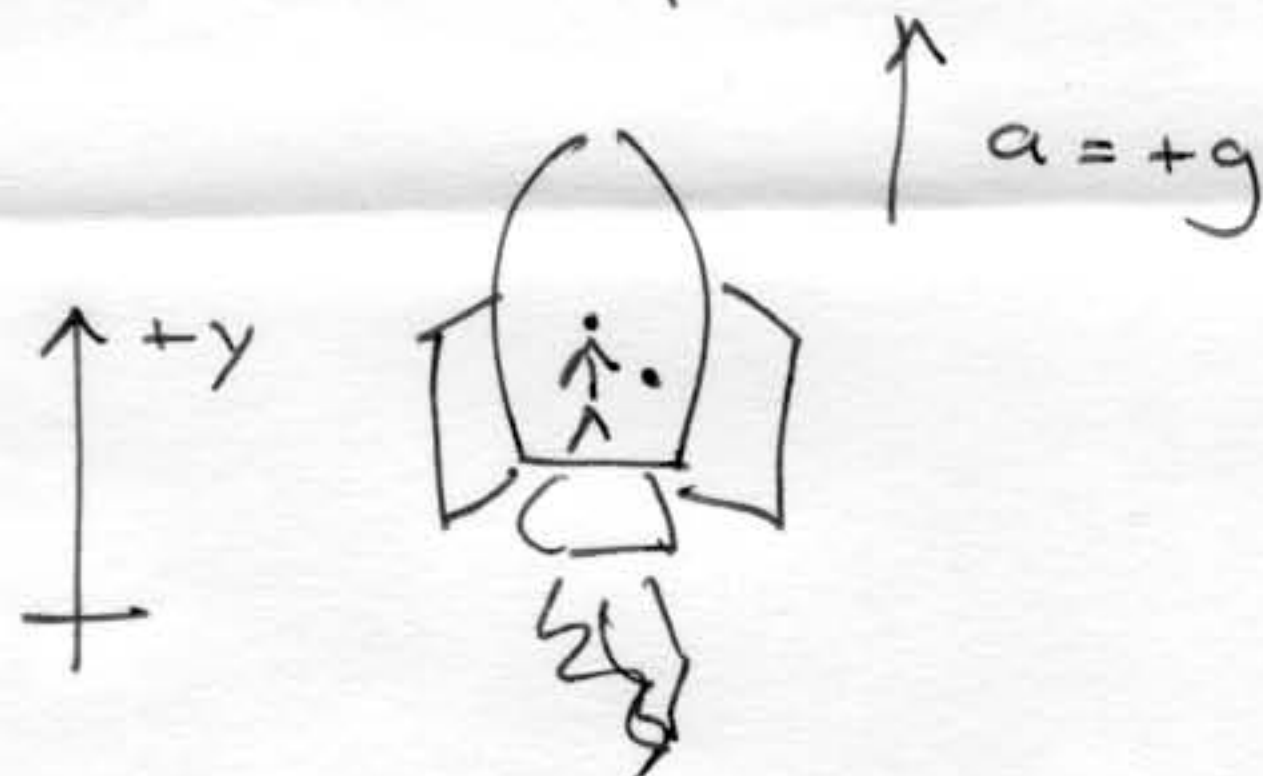
$$a_{\text{ball}} = -g$$

$t = 0$: drop

$$y_b = h - \frac{1}{2}gt^2 = 0$$

$$\Rightarrow t = \sqrt{\frac{2h}{g}}$$

in space



$$a_{\text{floor}} = +g$$

$$a_{\text{ball}} = 0$$

$t = 0$: drop

$$y_f = \underbrace{v_0}_{\text{rocket velocity at } t=0} t + \frac{1}{2}gt^2$$

v_0 = rocket velocity at $t = 0$

$$y_b = \cancel{v_0 t} h + v_0 t$$

$$y_b = y_f \Rightarrow$$

$$h + \cancel{v_0 t} = \cancel{v_0 t} + \frac{1}{2}gt^2$$

$\Rightarrow$ same time