

FORCES: 2<sup>ND</sup> LAW - FUNDAMENTAL EXAMPLE SOLUTIONS

①  $m = 2 \text{ kg}$

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

$$\sum \vec{F} = \langle 1, 3, 4 \rangle \text{ N}$$

$$\langle 1, 3, 4 \rangle = 2 \langle a_x, a_y, a_z \rangle$$

$\vec{a}?$

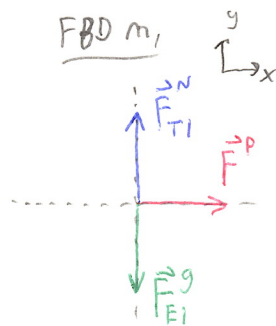
3 EQUATIONS!

$$\begin{cases} 2a_x = 1 \rightarrow a_x = \frac{1}{2} \\ 2a_y = 3 \rightarrow a_y = \frac{3}{2} \\ 2a_z = 4 \rightarrow a_z = 2 \end{cases}$$

$$\vec{a} = \langle \frac{1}{2}, \frac{3}{2}, 2 \rangle \text{ m/s}^2$$

②  $m_1 = 5 \text{ kg}$

$$|\vec{F}^P| = 4 \text{ N}$$



$$\sum F_x = m_1 a_{1x}$$

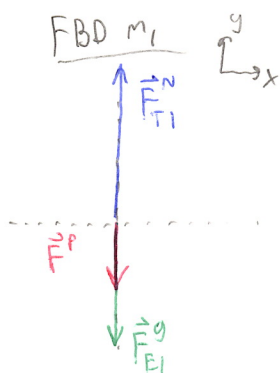
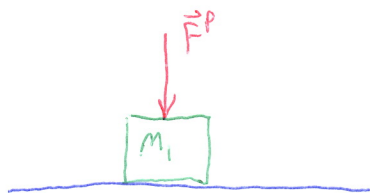
$$|\vec{F}^P| = m_1 a_{1x}$$

$$a_{1x} = \frac{|\vec{F}^P|}{m_1} = \frac{4}{5} \text{ m/s}^2$$

$$\vec{a} = \langle \frac{4}{5}, 0 \rangle \text{ m/s}^2$$

③  $m_1 = 5 \text{ kg}$

$$|\vec{F}^P| = 4 \text{ N}$$



$$\sum F_y = m_1 a_{1y} = 0$$

$$|\vec{F}_{T1}^N| - |\vec{F}^P| - |\vec{F}_{EI}^g| = 0$$

$$|\vec{F}_{T1}^N| = |\vec{F}^P| + m_1 g$$

$$|\vec{F}_{T1}^N| = 4 + (5)(9.8)$$

$$|\vec{F}_{T1}^N| = 53 \text{ N}$$

$$\vec{F}_{T1}^N = \langle 0, 53 \rangle \text{ N}$$