CHAPTER 4: Interactions & Newton's Laws

$$\Sigma\vec{F} = m\vec{a} \quad \Leftrightarrow \quad \begin{cases} \Sigma F_x = ma_x \\ \Sigma F_y = ma_y \end{cases}$$

$$\Sigma\vec{F} = (\Sigma F_x, \Sigma F_y) \;\; ; \;\; \vec{a} = (a_x, a_y)$$

Gravitational Force (magnitude):

$$F = G\frac{m_1 m_2}{r^2} \;\; ; \;\; G = 6.673\,10^{-11}\, Nm^2/kg^2$$

Weight (magnitude): $W = mg$

Static Frictional Force (magnitude):

$$f_s^{MAX} = \mu_s F_N$$

Kinetic Frictional Force (magnitude):

$$f_k = \mu_k F_N$$