

## Possibly useful relations:

$$\vec{A} = A_x \hat{i} + A_y \hat{j} + A_z \hat{k} \quad |\vec{A}| = \sqrt{A_x^2 + A_y^2 + A_z^2}$$

$$\cos \theta = \text{adjacent/hypotenuse} \quad \tan \theta = \sin \theta / \cos \theta$$

$$\sin \theta = \text{opposite/hypotenuse} \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\vec{v}_{\text{avg}} = \Delta \vec{r} / \Delta t$$

$$\vec{v}(t) = \frac{d\vec{r}}{dt}$$

$$\vec{a}_{\text{avg}} = \Delta \vec{v} / \Delta t$$

$$\vec{a}(t) = \frac{d\vec{v}}{dt}$$

$$\vec{v}_f = \vec{v}_i + \vec{a}t$$

$$v_{\text{avg}} = \frac{v_i + v_f}{2}$$

$$x_f = x_i + v_i t + \frac{1}{2} a t^2$$

$$\vec{r}_f = \vec{r}_i + \vec{v}_i t + \frac{1}{2} \vec{a} t^2$$

$$x_f = x_i + v_{\text{avg}} t$$

$$v_f^2 = v_i^2 + 2a\Delta x$$

$$\vec{v}_{AB} = \vec{v}_{AC} + \vec{v}_{CB}$$

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

$$\vec{F}_{AB} = -\vec{F}_{BA}$$

$$\vec{F}_g = \vec{W} = m\vec{g}$$

$$f_s \leq \mu_s N$$

$$f_K = \mu_K N$$

You calculations will be a bit easier, if you use  $g=10 \text{ m/s}^2$  instead of  $9.8 \text{ m/s}^2$