

Going down

① Givens

$$m = 66.678\text{kg}$$

$$\vec{g} = 9.81\text{m/s}^2[D]$$

$$\vec{a}_{su} = 0.8\text{m/s}^2[D]$$

$$\vec{a}_{sd} = 0.3\text{m/s}^2[U]$$

② Rearrange

$$\Sigma\vec{F} = \vec{F}_{net}$$

$$\vec{F}_{net} = \vec{F}_g + \vec{F}_n$$

$$\vec{F}_g + \vec{F}_n = m\vec{a}$$

$$\vec{F}_n = m\vec{a} - \vec{F}_g$$

$$\vec{F}_n = m\vec{a} - m\vec{g}$$

③ Solve for speeding up

$$\vec{F}_n = m\vec{a}_{su} - m\vec{g}$$

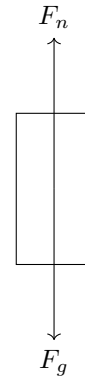
$$\vec{F}_n = (66.678\text{kg})(-0.8\text{m/s}^2) - (66.68\text{kg})(-9.81\text{m/s}^2)$$

$$\vec{F}_n = (66.678\text{kg})(-0.8\text{m/s}^2) - (-654.13\text{N})$$

$$\vec{F}_n = (-53.342\text{N}) - (-654.13\text{N})$$

$$\vec{F}_n = 600.7876\text{N}$$

$$\boxed{\vec{F}_n = 600.7876\text{N}[U]}$$



④ Solve for slowing down

$$\vec{F}_n = m\vec{a}_{sd} - m\vec{g}$$

$$\vec{F}_n = (66.678\text{kg})(0.3\text{m/s}^2) - (66.68\text{kg})(-9.81\text{m/s}^2)$$

$$\vec{F}_n = (66.678\text{kg})(0.3\text{m/s}^2) - (-654.13\text{N})$$

$$\vec{F}_n = 20.003\text{N} - (-654.13\text{N})$$

$$\vec{F}_n = 674.133\text{N}$$

$$\boxed{\vec{F}_n = 674.133\text{N}[U]}$$