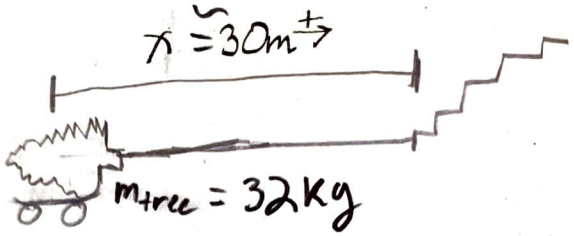
① Allison Clark | Tree impalement

Given: FAS

Assume:
- No friction
- on wheels
- @ ½x, @ Equilibrium
- treat bungee chord like spring
- Bungee chord - weightless
- inelastic collision
- $v_0 = 0$
- force in on direction
- $x = 30\,m$
- $K = 67.8\,N/m$

Find v_f



$F_{net} = ma$ to the right

$$\frac{kx}{m} = \frac{ma}{m}$$

$$\frac{(67.8\,N/m)(15\,m)}{32\,kg} = 38.137\,m/s^2$$

$$F_{bungee\ @\ t=0} = (38.137\,m/s^2)(32)$$

$$= \boxed{1.2\,KN}$$

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$W_{nc} = 0$? Yes, Friction = 0 Ideal Situation

$0 = \Delta E$

$E_0 = E_f$

$K_0 + V_0 = K_f + V_f$ ($V_0 = 0$, $V_f = 0$) $x = 15\,m$

$\frac{1}{2}Kx^2 = \frac{1}{2}mv_f^2$

$\sqrt{\frac{67.8(15)^2}{(32)}} = v_f = 21.83\,m/s$

$\approx 78.48\,km/h$

$\approx 48.76\,m/h$