HW 25 (ID: 6265)

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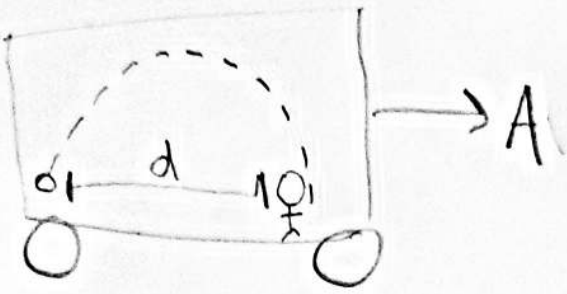

In accel reference frame: $m\ddot{y} = -mg$

$m\ddot{x} = -mA$

$\ddot{x} = -A$

$\dot{x} = -At + C_1$

$x = -\frac{1}{2}At^2 + C_1 t + C_2$

$C_1 = V_{xi} = 0$

$C_2 = x_i = 0$

$\ddot{y} = -g$

$y = -\frac{1}{2}gt^2 + C_1 t + C_2$

$C_1 = V_{yi}$

$C_2 = y_i = 0$

$y = -\frac{1}{2}gt^2 + V_{yi}t$

if $V_{yi} = 1\ m/s$ $\quad y = -\frac{1}{2}\left(9.8\frac{m}{s^2}\right)t^2 + 1t$

$t\left(1 - \frac{1}{2}(9.8t)\right) = 0$ $\quad 0 = -\frac{1}{2}(9.8)t^2 + t$

$t = 0$ $\quad t = 0.204$ $\quad$ plug into X equation w/ $d = 5\ cm$

$d = 0.05\ m$

$-0.05 = -\frac{1}{2}A(0.204)^2$

$-A = \frac{-0.1}{0.204^2} \approx \boxed{+2.4029\ \frac{m}{s^2}}$

negative x dir.