Pulleys, Weights, Motion in 2 Directions.

- Isolate masses + directions.
- Apply Newton's 2nd Law to each mass.
- Solve simultaneously.

\[ F_f = HN \]
\[ N = 10^* \]
\[ 10^* \]
\[ F_f = 2^* \]
\[ HN = (0.2)(10^*) \]

\[ \begin{align*}
\mathbf{F}_x &= m\ddot{x} \\
\mathbf{F}_y &= m\ddot{y} \\
2T - 20^* &= \left(\frac{20^*}{32.2}\right)\ddot{y} \\
T &= 10^* + \frac{10}{32.2}a_y
\end{align*} \]

\[ \left[ 10^* + \frac{10}{32.2}a_y \right] - 2^* = \frac{10}{32.2}a_x \]
\[ \frac{32.2}{10} \left[ 8 + \frac{10}{32.2}a_y \right] = \left[ a_x = 25.76 + a_y \right] \]

Need to use relation of distance.

Cable length = constant
\[ S_A + 2S_B = L \]
\[ \dot{S}_A + 2\dot{S}_B = 0 \]
\[ S_A + 2\dot{S}_B = 0 \]

\[ a_A = -2a_B \] sub. (3)

\[ -2a_y = 25.76 + a_y \]
\[ a_y = \frac{25.76}{-3} \approx -8.6 \quad \therefore a_x = +17.2 \]
back sub. into (2) Solve for $T$

$$T = 10^4 + \frac{10}{32.2} \cdot (-8.6 \frac{1}{s^2}) = \boxed{7.33^4 = T}$$

? $V_A$ when Block A has moved 4'?

Since time is not a factor, use the eq. that relates dist., vel., & acc.

$$2a_x(s - s_0) = V^2 - V_0^2$$

$$2 \left( 17.2 \frac{1}{s^2} \right) (4') + \left( 2 \frac{1}{s} \right)^2 = V^2$$

$$\sqrt{V} = V$$

$$V = 11.899 \div \boxed{11.9 \frac{1}{s} = V}$$

$a_A = 17.2 \frac{1}{s^2}$