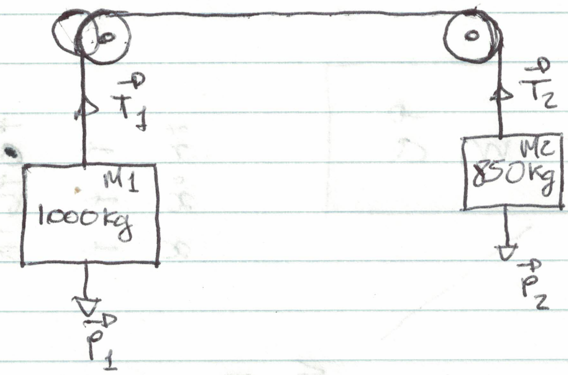
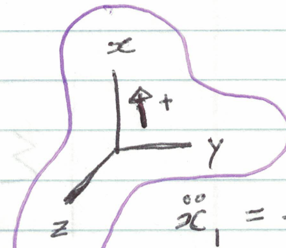
detailed




$\ddot{x}_1 = -\ddot{x}_2$

$x_i(t) \rightarrow x_i$

$$\boxed{M \, \ddot{\vec{x}} = \sum \vec{F}_R}$$

$T_1 = T_2$

$$M1: \quad M1 \, \ddot{x}_1 = \vec{P}_1 + \vec{T}_1$$
$$M2: \quad M2 \, \ddot{x}_2 = \vec{P}_2 + \vec{T}_2$$

$$M_1 \ddot{x}_1 - M_2 \ddot{x}_2 = \vec{P}_1 - \vec{P}_2 \quad ; \quad \boxed{\ddot{x}_1 = -\ddot{x}_2}$$

$$M_1(-\ddot{x}_2) - M_2 \ddot{x}_2 = \vec{P}_1 - \vec{P}_2$$
$$(-M_1 - M_2)\,\ddot{x}_2 = \vec{P}_1 - \vec{P}_2 \quad ; \quad \boxed{\vec{P}_1 = -P_1 \vec{e}_x \; ; \; \vec{P}_2 = -P_2 \vec{e}_x}$$

$$(-M_1 - M_2)\,\ddot{x}_2 = (-P_1) - (-P_2)$$
$$= P_2 - P_1$$

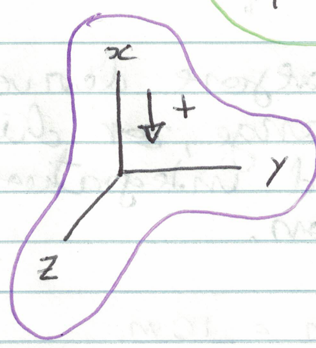
basics

$\frac{-1}{-1} = 1$

$X \cdot 1 = X$

$$\ddot{x}_2 = \frac{P_2 - P_1}{-M_1 - M_2} \frac{\times -1}{\times -1} = \frac{P_1 - P_2}{M_1 + M_2}$$

if




$$M_1 \ddot{x}_1 - M_2(-\ddot{x}_1) = \vec{P}_1 \; [redacted] \; \vec{P}_2$$

$$\boxed{\begin{array}{l} \ddot{x}_2 = -\ddot{x}_1 \\ \vec{P}_1 = P_1 \vec{e}_x \\ \vec{P}_2 = P_2 \vec{e}_x \end{array}}$$

$$(M_1 + M_2)\,\ddot{x}_1 = P_1 - P_2$$

$$\ddot{x}_1 = \frac{P_1 - P_2}{M_1 + M_2}$$

Most of the time when doing exercises, tend to skip the basic steps, which are the most important because think it is generaly known, but is not the case. For think the public has the same level of understanding, instead of helping land up complicating the explanation.

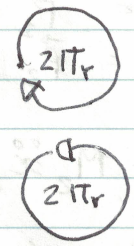
All the same shit, just different smell.

$$\boxed{\sum \vec{F}_R = m\vec{a}}$$

$\ddot{x} \to \vec{a}$ - acceleration
$\dot{x} \to \vec{v}$ - speed
$x \to \vec{x}$ - position

$$\sum F_{R_x} = m a_x \qquad \sum F_{R_y} = m a_y$$

$$\boxed{\sum \vec{T}_R = J\alpha}$$



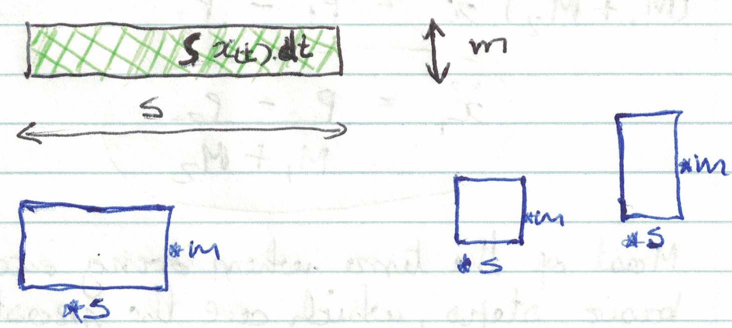

α - angular accel.
ω - cycles/sec
θ - angle

—//—

if $x_{(t)}$ is measured by meters [m] then its derivative in relation to time will give [$\frac{m}{s}$].
On the other hand if we integrate the same function ($x_{(t)}$), we will get [m.s].

therefore derivatives gives us rates of change, or division.
And integration gives us quantity, or multiplication.

$$100\,\frac{m}{s} = \frac{10m}{0.1s} = \frac{1m}{0.01s}$$




100 m.s = 10 m . 10 s square
100 m.s = 100 m . 1 s rectangle
100 m.s = 1 m . 100 s rectangle