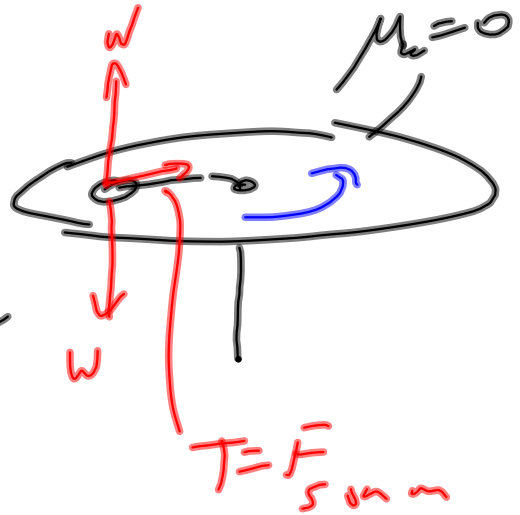
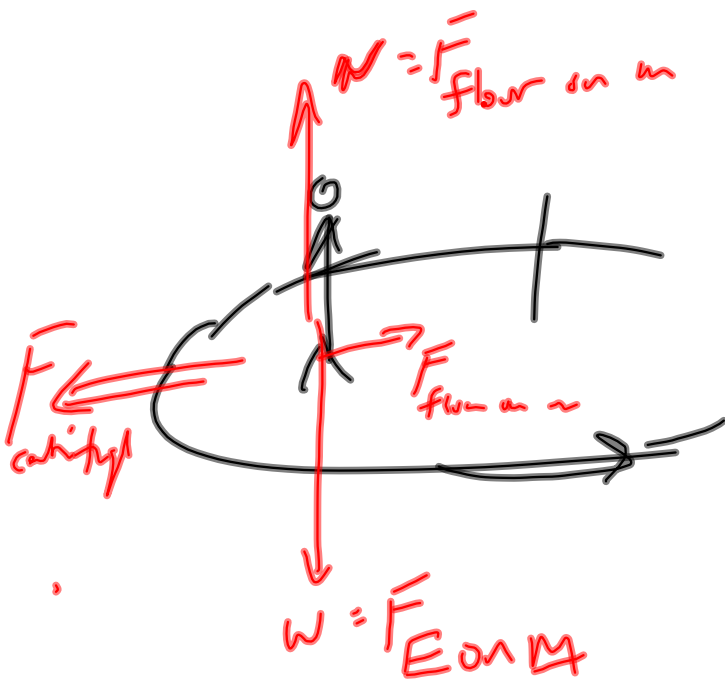


$$\vec{F}_{\text{net}} = m\vec{a}$$

only in an inertial ref frame.
 $\vec{a} = 0$



$\vec{F}_{net} = m\vec{a}$ { only in non accel. ref. frame

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

$a = \frac{v^2}{R} = \frac{\left(\frac{2\pi R}{T}\right)^2}{R}$

$= \frac{4\pi^2 R}{T^2} = \frac{4\pi^2}{T^2} R \cos 37^\circ$

$= .027 \text{ m/s}^2$

$R_E = 6.38 \times 10^6 \text{ m}$

$T = 24 \text{ hr}$

$$\vec{F}_{net} = m \vec{a} \quad v \ll c$$

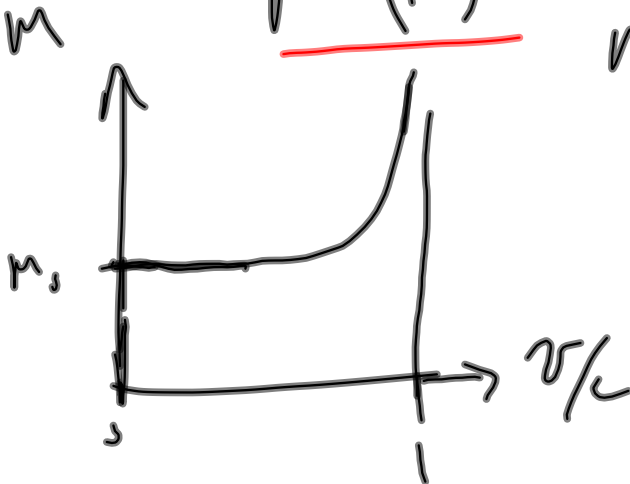
$$\gamma = \sqrt{1 - (v/c)^2}$$

$$\text{Mach } 10 = 10 v_s = 3400 \text{ m/s} \approx 7000 \text{ mph}$$

$$\frac{v}{c} = \frac{3400 \text{ m/s}}{3 \times 10^8 \text{ m/s}} \approx 10^{-5} \quad \left(\frac{v}{c}\right)^2 = 10^{-10}$$

$$\sqrt{1 - (v/c)^2} = .9999999999993 \approx 1$$

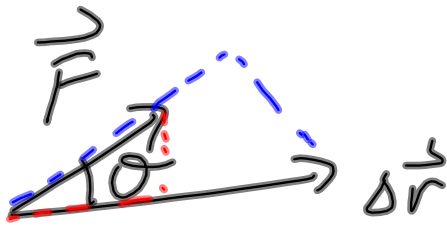
$$m = \frac{m_0}{\sqrt{1 - (v/c)^2}}$$



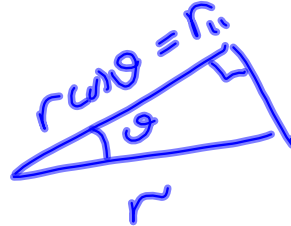
$$p + p \rightarrow d + e + \bar{\nu}_e$$

$$\nu_e \rightarrow \nu_\mu \rightarrow \nu_\tau \rightarrow \nu_e$$

$$W = F \Delta r_{||} = \vec{F}_{||} \Delta r$$



$$F \cos \theta = F_{||}$$



$$W_{mg} = -mgh$$

$$= -mg \Delta y$$

Climb Mtn

$$\Delta y = 14200' - 6462' \text{ in } 7 \text{ hr}$$

$$= 7800' = 2377 \text{ m} = \underline{2377 \text{ m}}$$

$$W = -(80 \text{ kg}) (10 \text{ m/s}^2) (2400 \text{ m})$$

$$|W| = 1.9 \text{ MJ} \left(\frac{1 \text{ Cal}}{4184 \text{ J}} \right) = 459 \text{ Cal}$$

~ 3 cups 100%

$$P \stackrel{!}{=} \frac{W}{\Delta t} \sim \frac{1.9 \text{ MJ}}{7 \text{ hr} \left(\frac{3600 \text{ s}}{1 \text{ hr}} \right)}$$

~ energy per
time

$$= 76 \frac{\text{J}}{\text{s}} = 76 \text{ W}$$

Jans Watts - W -

$$W_{\text{RP}} = (73 \text{ kg}) (9.8 \frac{\text{m}}{\text{s}^2}) (3.25 \text{ m}) = 2320 \text{ J}$$

$$T_{\text{RP}} = 3.34 \text{ s} \quad P = \frac{2320 \text{ J}}{3.34 \text{ s}} = \underline{690 \text{ W}}$$

Free-body diagram showing forces on a block of mass m on a horizontal surface. The forces are:

- Weight \vec{W} (downward)
- Normal force \vec{N} (upward)
- Friction force $\vec{f} = \mu N$ (to the left)
- Tension force \vec{T} (upward and to the right, at angle θ)

Coordinate system: x (horizontal, right), y (vertical, up).

	x	y
\vec{W}	0	$-mg$
\vec{N}	0	$+N$
\vec{f}	$-\mu N$	0
\vec{T}	$+T \cos \theta$	$+T \sin \theta$
\vec{F}_A	$T \cos \theta - \mu N$	$N - mg + T \sin \theta$
$= m\vec{a}$	$= 0$	$= 0$

Resulting equation:

$$T(\theta) = \dots$$