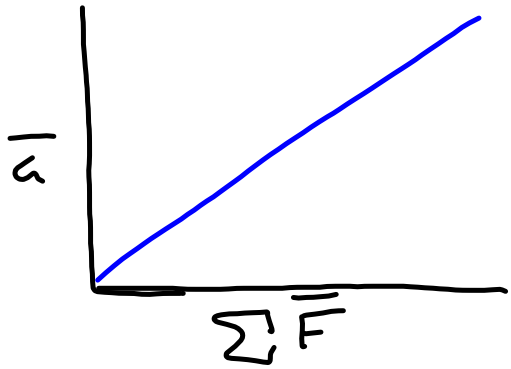
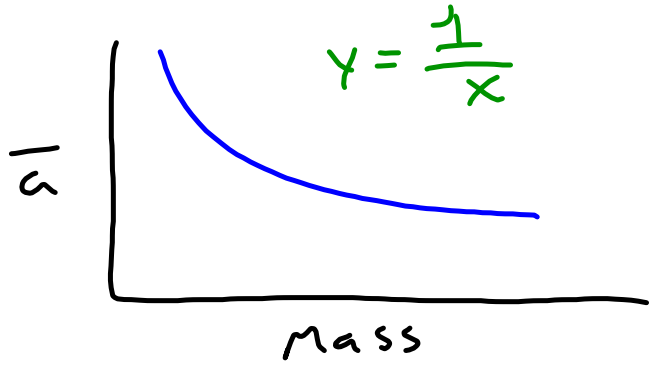
Group	1] Const. Net Mass	Slope	Eqn.	2] Const. ΣF	Slope (linearize!)	Eqn.
1	0.5 kg	1.39 $\frac{m/s^2}{N}$	$y=1.39x+.03$	0.5 N	0.52 $\frac{m/s^2}{kg}$	$y=0.52x-0.13$
2	0.583 kg	1.133 $\frac{m/s^2}{N}$	$y=1.133x+.178$	1.30 N	0.541 $\frac{m/s^2}{kg}$	$y=0.941x+0.072$
3	0.583 kg	1.44 $\frac{m/s^2}{N}$	$y=1.44x+0.024$	0.5 N	0.152 $\frac{m/s^2}{kg}$	$y=.152x+.465$
4	0.5 kg	1.281 $\frac{m/s^2}{N}$	$y=1.281x+0.279$	0.45 N	0.855 $\frac{m/s^2}{kg}$	$y=0.855x-0.74$
5	0.595 kg	2.23 $\frac{m/s^2}{N}$	$y=2.23x-.38$	0.54 N	0.46 $\frac{m/s^2}{kg}$	$y=0.46x-0.024$
6	.5 kg	5.09 $\frac{m/s^2}{N}$	$y=5.09x-0.53$	1.50 N	.100 $\frac{m/s^2}{kg}$	$y=0.1x-.121$

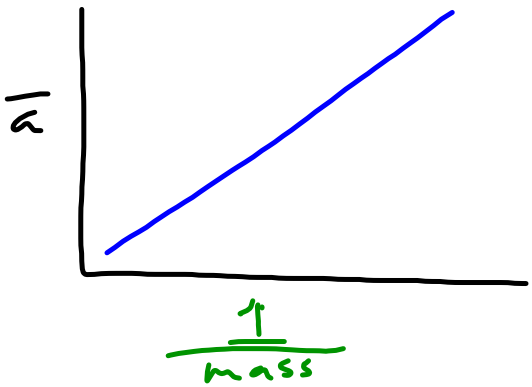


$$\text{slope} = \frac{\Delta \bar{a}}{\Delta \sum \bar{F}} = \frac{1}{m}$$

$$\frac{m/s^2}{kg \cdot m/s^2} = \frac{1}{kg}$$



$$y = \frac{1}{x}$$



$$F = ma$$

$$\text{slope} = \frac{\Delta \bar{a}}{\Delta \frac{1}{\text{mass}}}$$

$$\frac{m/s^2}{1/kg} = \frac{kg \cdot m}{s^2} \equiv N$$

Newton

$$\sum \bar{F} = ma$$

Free-Particle under the influence of g

$$\sum F = ma$$

$$F_g = ma_g$$

Unbalanced Force Model

- Properties
  - Force
  - mass
  - acceleration
- Representations
  - Graphical
    - $\bar{F}$ v. $\bar{a}$
    - m v. $\bar{a}$
  - Diagrammatic
    - Force (stylized version of situation)
    - Free-Body (the dot)
  - Mathematical
    - $\sum \bar{F} = m\bar{a}$
- Rules of Behavior
  - Net force and acceleration vectors point in same direction.
  - If there is a net force, then there is acceleration (and vice versa).

QUIZ → WEDNESDAY

- UFM (to this point)
- CMM [Conservation of Momentum Model]

INITIAL FINAL

1: $m_1 v_1$ $(1000\,kg)(3\,m/s)$

2: $\emptyset$

$27{,}000\,kg\,m/s$

$1+2 \quad (m_1+m_2)v$

$$m_1 v_1 + m_2 v_2 = (m_1 + m_2)v$$

initial

$\vec{p}_{total} = \emptyset$

$\vec{p}_{af}$ $\vec{p}_{tf}$