PHYS 210 - General Physics I

FORCES

- Forces!
- Newton's Laws of Motion

Newton's Laws of Motion

Note that Newton's Second Law is a *VECTOR* equation:

$$\vec{F}_{NET} = m\vec{a} = \begin{cases} F_{NET,x} = ma_x \\ F_{NET,y} = ma_y \\ F_{NET,z} = ma_z \end{cases}$$

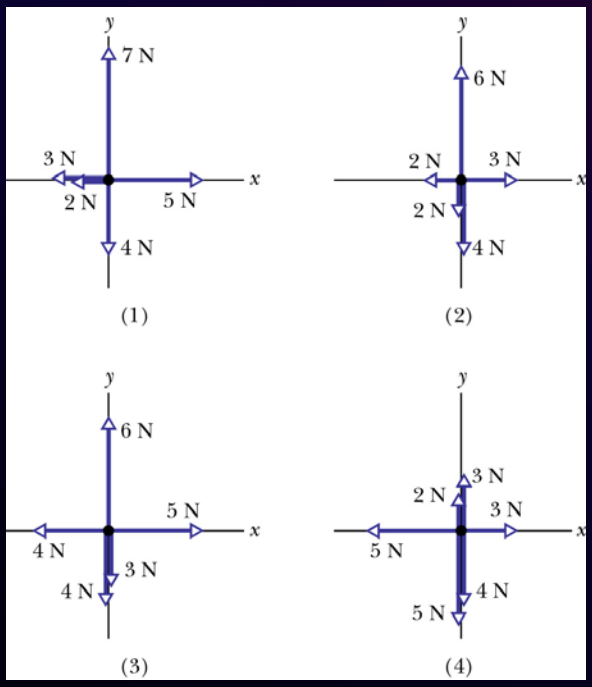
∀ Cartesian coordinate systems you care to define!

Net Force

Q: What is the net force in each situation?

$$\vec{F}_{NET} = \sum_{i=1}^{n} \vec{F}_i$$

Q: If the forces act on a mass of 2 kg, what is the acceleration?



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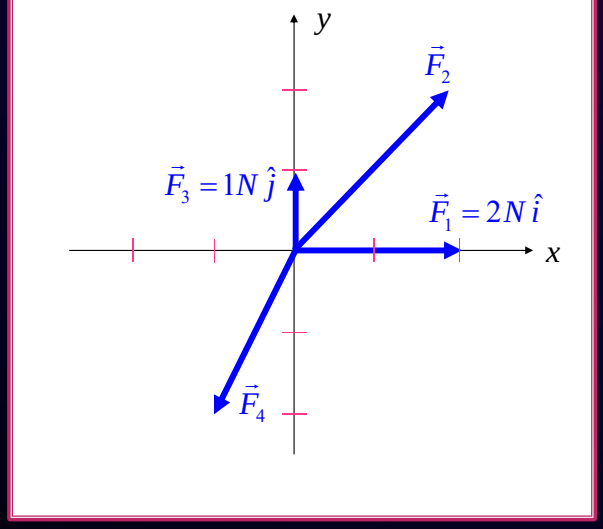

the four
fundamental forces of nature

In order of increasing strength:

- **Gravitational force**
- **Electromagnetic force**
- **Weak nuclear force**
- **Strong nuclear force**

Specific forces in the text are all related
to one of these, *e.g.,* weight, normal force, friction, tension.

Some particular forces:

NOTE: Mass is not Weight!!

- Gravity near planetary surface (weight):
  - $F_g = m\, g = W$
- Normal force, *N*
  - (perpendicular to surface)
- Tension, *T*
  - in a cord, rope, string, cable, *etc.*
  - Assume T in a section is constant
  - "massless," "non-stretching"
- Friction - resistance to motion


EXCUSE OVERWHELMED