Model Name:

Balanced Force Model

Description

Scenarios where forces are balanced in a direction

- object not moving
- object moving with constant velocity

Properties

Forces (F) → N

mass (m) → kg

Weight (F_g) → N

acceleration (a) → m/s^2

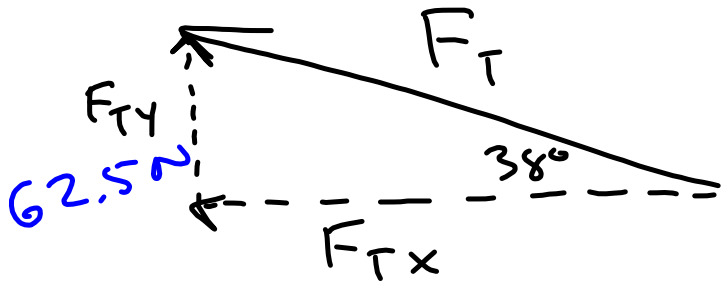
Net Force (F_{Net}) → N

Representations

- Force Diagrams
  (Free-Body Diagrams)
- Mathematically
  - $F_g = ma_g$
  - $F_{net} = \emptyset$
  - Trig Ratios → sine, cosine, tangent
- Written/Verbal

Rules of Behavior

- Forces come in pairs.
- Normal force is always perpendicular to a surface.
- Always gravity acting on an object on Earth.
- Break down force(s) into components.
- Net force is sum of forces in a direction.



$$\sin(38°) = \frac{F_{Ty}}{F_T}$$

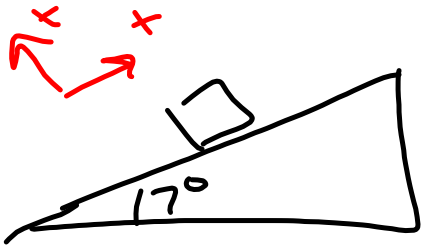
$$F_T = \frac{F_{Ty}}{\sin(38°)}$$

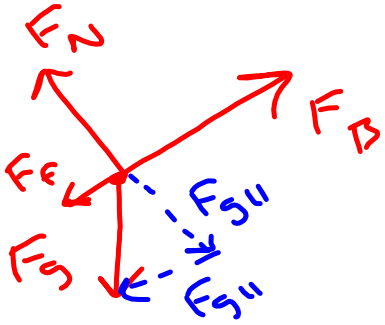
$$= \frac{62.5\,N}{\sin(38°)}$$

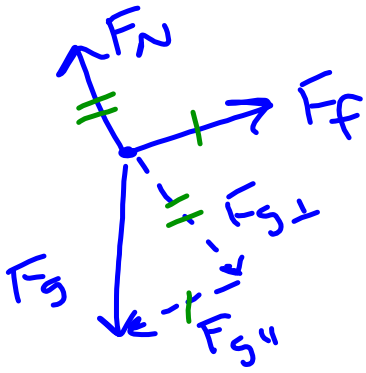
$$= 101.5\,N$$

$$F_T = \frac{62.5\,N}{\sin(5°)}$$

$$= 717.1\,N$$


+
+
17°


F_N
F_B
F_f
$F_{g\parallel}$
F_g
$F_{g\parallel}$


F_N
F_f
$F_{g\perp}$
F_g
$F_{g\parallel}$