


2 – Forces Newton's Second Law

The unbalanced force acting on an object equals the object's mass times its acceleration.

Push, Size, Motion

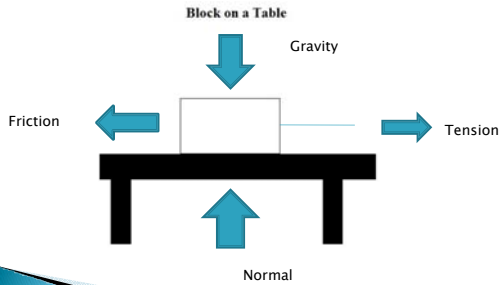


Forces are measured in Newtons

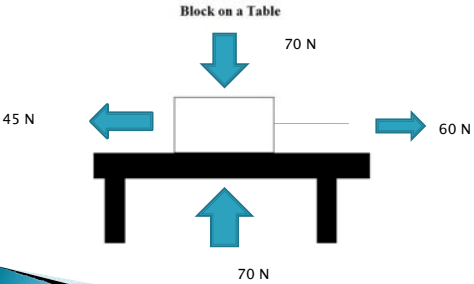


- Named after Isaac Newton
- Derived Unit
- Kilograms are mass
- Newtons are force
- $1\text{ N} = 1\text{ kg} \times 1\text{ m}/1\text{ s}^2$
- $1\text{ N} = .225\text{ lb}$

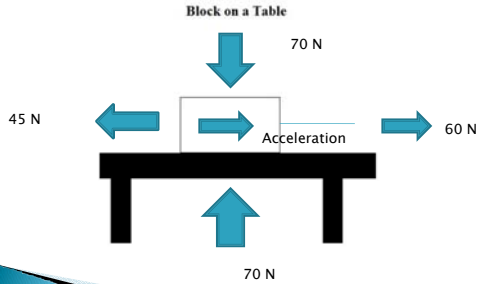
You must first balance the forces!



Which One is Bigger?



Which direction is the acceleration?



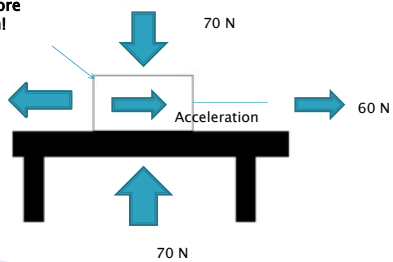
How big is the acceleration?

We need more information!

Mass = 5kg

45 N

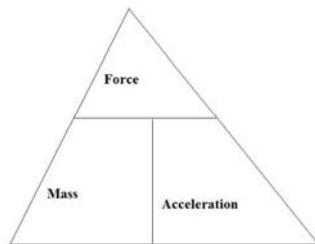
Block on a Table



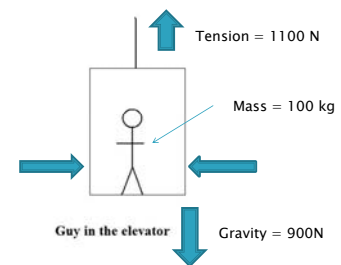
Force equals mass times acceleration!

- ▶ $F = ma$
- ▶ $F = 60 \text{ N} - 45 \text{ N} = 15 \text{ N}$
- ▶ $F = 15 \text{ N} = (5\text{kg}) * a$
- ▶ $A = 15\text{N}/5\text{kg} = 3 \text{ m/s}^2$

A Triangle to Help Us



Let's try One!



Here's the math!

- ▶ $F_{\text{net}} = F_t - F_g = 1100 - 900 \text{ N} = 200 \text{ N}$
- ▶ $F = ma = 200 \text{ N} = (100\text{kg}) * a$
- ▶ $A = 200 \text{ N} / 100\text{kg} = 2\text{m/s}^2$