

Honors Physics: Forces and Newton's Three Laws of Motion
Class Examples

Multiple Forces:

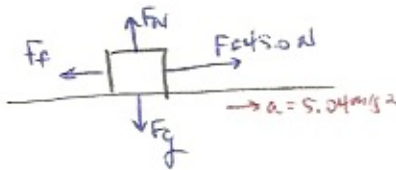
Example 5:

A 45.0 N force pulls on an 8.00 kg cat (why, because cats don't move!) while a force from friction resists the cat's movement. Yet, the cat accelerates forward with an acceleration of 5.04 m/s².

$\Sigma F_x = ma$ Non-Equilibrium

Equilibrium or Non-equilibrium: $\Sigma F_y = 0$ Equilibrium

- A. Draw the FBD
- B. Write a statement for the ΣF_x and ΣF_y
- C. What is the value of the normal force?
- D. What is the frictional force slowing the movement of the cat?



$$\Sigma F_x = F - F_f$$

$$ma = F - F_f$$

$$(8.00)(5.04) = 45 - F_f$$

$$40.32 = 45 - F_f$$

$$-4.68 = -F_f$$

$$\boxed{F_f = 4.68 \text{ N}}$$

$$\Sigma F_y = F_N - F_g$$

$$0 = F_N - mg$$

$$0 = F_N - (8.00)(9.8)$$

$$0 = F_N - 78.4$$

$$\boxed{F_N = 78.4 \text{ N}}$$

Friction Graph

