1st & 2nd Law Examples

Newton's 1st & 2nd Law Problems

- Recipe:

  1. Draw a force diagram
  2. Write Newton's equation for each mass **SEPARATELY** in x & y.

$$\Sigma F_x = ma_x$$
$$\Sigma F_y = ma_y$$

$$F_g = mg$$

  3. Note, forces are always (+). The direction the force points is (+) or (-).
  4. Each force diagram gets its own Newton's formulas.
  5. If the system is **at rest OR moving at constant speed, a = 0.**

Ex: A box (mass = 30 kg) is dragged at an angle of 30^0 along the ground at constant speed. The frictional force acting on the box is 15 N.

What is the tension force?

What is the normal force?

Ex: A rope is used to accelerate a 3 kg bucket upward. If the tension in the rope is 36 N, what is the acceleration?

Ex: A 25 kg box is pulled with by a rope with a force of 80 N at an angle of 20^0 above the horizontal. The friction force acting on the box is 30% of the normal force.

A) What is the normal force?
B) What is the frictional force?
C) What is the acceleration of the box?