Newton's Third law: $F = -F'$

Each action has a reaction, equals to in magnitude and opposite to it in direction.

* Action and reaction NEVER affect on the same object, so we can't find the resultant of them.

Recall that **The resultant** is a vector which has the same effect of many vectors that affect on one object.

Free-body diagram :-

A diagram that shows all the external forces acting on one object.

Equilibrium $\Rightarrow \Sigma F = 0$ according to Newton's 2nd Law.

$\Sigma F = m a$

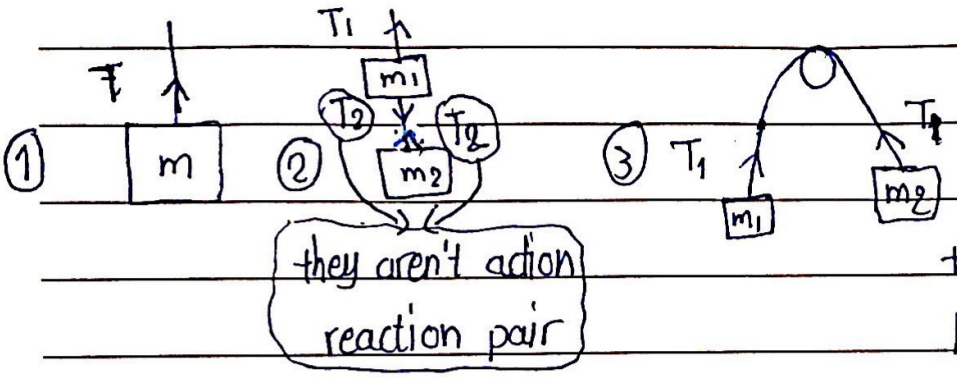
In equilibrium : $\Sigma F = 0 \Rightarrow 0 = ma = a = 0$

can't be zero

$a = 0$ → when object is at rest ⇒ this called static equilibrium
→ at constant velocity

In (suspended objects by strings) problems :

Every string affects on objects that are suspended by it with tension force in (~~mass~~ object → ~~string~~ string) direction



~~Pulley~~ The string around the pulley affects on objects by the same tension force

We ignore pully mass

In this type of questions, the positive direction is the direction of motion.

Apparant weight :-

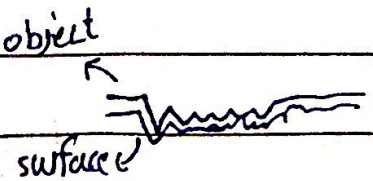
Indeed, the ~~balance~~ reading of normal balance equals the normal force that is applied on the object above which equals object's weight if there is no acceleration. However, if the balance is accelerating, the reading of the balance doesn't equal the real weigh which is called the apparant weight.

Friction :-

Objects look smooth to the naked eye, but under a microscope ~~to~~ objects have irregularities which impede the motion

Rough surface → there is friction

Smooth surface → no friction



If we need to move an object over rough surface, we must affect on it by a force that is more than the maximum static friction force