Dynamics

Newton’s 3 laws

1. Law of Inertia
   1. An object in motion will remain in motion so long as no outside force acts on it. An object at rest will remain at rest until an outside force acts on it.
2. F = ma
   1. An object will accelerate when a force is applied to it.
3. For every force there is an equal and opposite reactionary force.

Proportions

Proportional

Force and Acceleration are DIRECTLY PROPORTIONAL

(When one increases, the other increases)

Ex:

Acceleration and Mass are INVERSELY PROPORTIONAL

(When one increases, the other decreases)

Gravitational Force (Fg)

Fg = mg

g= 9.81m/s2

Example: A 354kg mass is accelerated by 1.2m/s2. What force is being applied?

F=ma

= (354) (1.2)= 424.8N, 420N

Example: What is the net force acting on a BROKEN TV when it is being pulled to the left with 321N and pulled to the right with 181N?

FNET = F1 + F2 +F3 + …

FNET= (-321) + (181) = -140.N

Follow up: What is the acceleration? (mTV= 35kg

F=ma

a = FNET/mNET = -140/35= -4.0m/s2 or 4.0m/s2 [left]

Example: A hockey puck (m=325g) is accelerated from rest to 32m/s over a distance of 11.5cm. What force was applied?