

Ch 3

Sec 3.2

obj: What is inertia and how is it related to Newton's first law of motion?

Inertia

- Is an inherited property.
- A property that resists a change in an object's motion.
- mass is involved w/ inertia.
- mass is directly related to inertia.
- * A large mass means it has a large inertia.
- We measure inertia by an object's mass.

Newton's Laws of Motion

- Newton's Law describe motion.
- He came up w/ three Laws.
- 1) Newton's First Law of Motion
 - * Describes the motion of an object which has balanced forces acting on the object.
 - * Object's state of motion will not change until a net force acts on the object.
 - * An object at rest stays at rest.
 - * An object in motion stays in a straight line motion.
- Newton's first Law of Motion is also called the Law of Inertia.

2) Newton's 2nd Law of Motion

* Describes what happens to an object's state of motion when a net force acts on an object.

* When a net force acts on an object the object will accelerate in the direction of the net force for as long as the net force acts on the object.

- Newton's 2nd Law depends on the object's mass and the size of the net force.

$$a = \frac{F_{\text{net}}}{m}$$

- Newton's 2nd Law shows how a , F_{net} and m are related.

$$F_{\text{net}} = ma$$

(kg · m/s²) ⇒ Newton

A 50.0N net force is applied to a 12.0kg mass. What is the acceleration of the mass?

Knowns

$$F_{\text{net}} = 50.0\text{N}$$

$$m = 12.0\text{kg}$$

Unknowns

$$a = ?$$

$$a = \frac{F_{\text{net}}}{m}$$

$$= \frac{50.0\text{N}}{12.0\text{kg}}$$

$$= 4.17\text{m/s}^2$$