

Intro to Kinematics

Kinematics is the mathematical treatment of the motions of bodies without regard to the forces that produce the motion.

Scalar Quantities vs. Vector Quantities

A **scalar** quantity has magnitude but **not direction**. For example, the odometer in your family car tells you how fast the car is moving (magnitude or numerical value) but not the direction it is moving. Therefore, the odometer is telling you a **scalar** quantity (in this case: speed). For example, it tells you 45 mph, but **NOT** 45 mph East.

Here are some examples of **scalar** quantities:

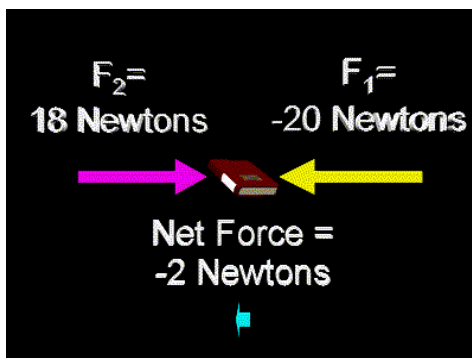
Distance
Time
Speed
Mass
Temperature
Energy



A **vector** quantity has **both** magnitude and direction. For example, if you ask for directions to the beach in a foreign country, a citizen may tell you 50 km East. The citizen has given you both a magnitude (numerical value) and a direction (North, South, East, West, etc.)

Here are some examples of **vector** quantities:

Displacement
Acceleration
Force
Momentum
Electric Force
Magnetic Force



Practice: Determine whether the following are vectors or scalars.

a.) 40 m/s East

b.) 30 m

c.) 40° C

d.) 20 kg(m/s) Northeast

e.) 25 N

f.) 25 N West

g.) Distance

h.) Displacement

i.) Velocity

j.) Speed

k.) Momentum