

Numbers in Physics

Scalars and Vectors

Scalars

- Number (EX: 5 batteries, 3 lightbulbs)
- Number with units (EX: 10 seconds, 273 degrees)
- Items that are scalars include the following:
- Time, temperature, kelvin, mass, distance, speed, work, power, energy

Vectors

- Items that have both magnitude and direction
- Vectors are often illustrated by an arrow
- Arrow starts at its tail and points with its head
- EX: 30 meters East, 150 Newtons down to the center of the earth
- Items that are vectors include the following:
- Displacement, Velocity, Acceleration, Force, Momentum, Impulse, Electric Field

Add Vectors

- Given two vectors, $V(A)$ and $V(B)$
- Put the tail of $V(B)$ on the head of $V(A)$
- Connect the tail of $V(A)$ to the head of $V(B)$

Example

- $V(A)$ is 3 meters East
- $V(B)$ is 4 meters East

- Add $V(A) + V(B) = \text{Resultant } V(A + B)$
- $V(A + B) = 7$ meters East

Example

- $V(A)$ is 10 meters North
- $V(B)$ is 4 meters South
- $V(A + B)$ is $10 - 4 = 6$ meters North

Example

- $V(A)$ is 12 meters East
- $V(B)$ is 5 meters North
- $V(A + B)$ is the hypotenuse
- $V(A + B)$ is 13 meters north of east
- Angle is $\arctan(5/12)$