VECTORS

Chapter 6 –Introduction to Vectors

(*Material adapted from Chapter 6 of your text*)

A∞Ω
MATH@TD

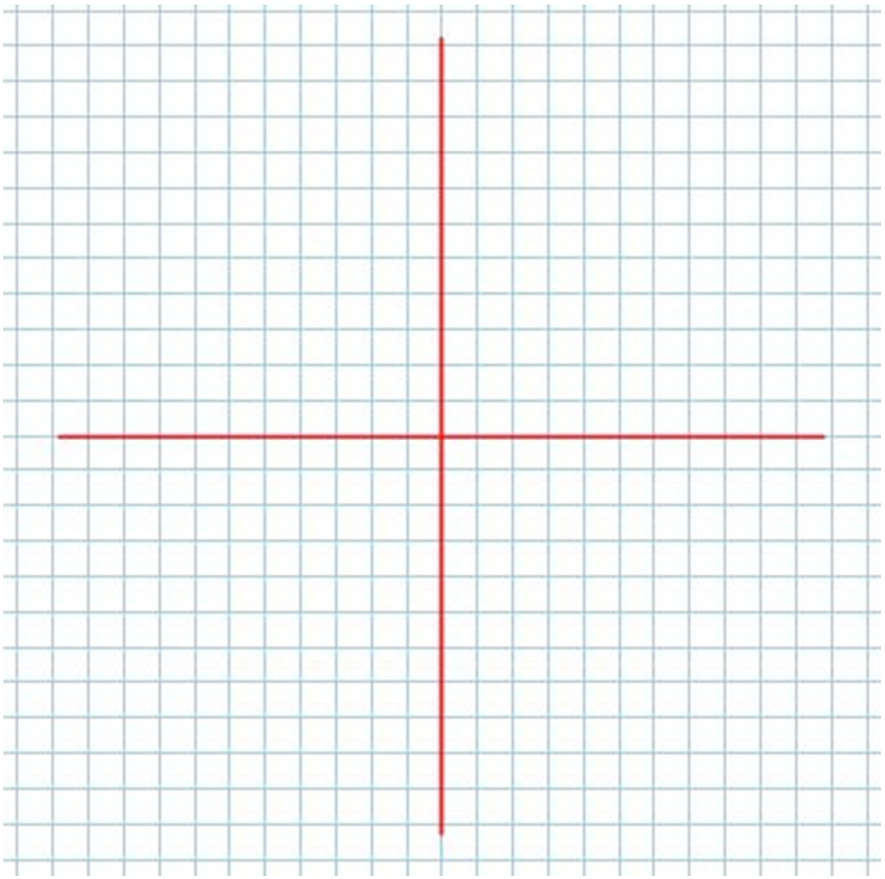
6.1 An Introduction to Vectors

Definition 6.1.1

A **vector** is a **mathematical object** which carries **two characteristics:**

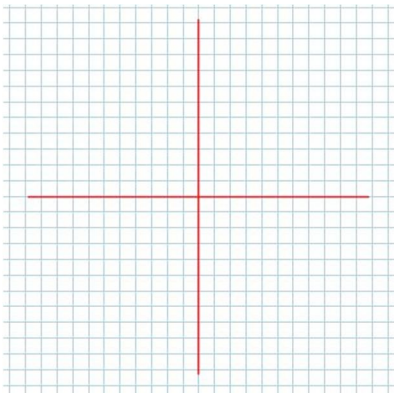
Geometrically we can think of (or visualize) vectors as **directed line segments**

Picture



Notes:

Some Basic Notations



1) In general we "write" vectors (or algebraically represent vectors):

a) With **capital letters** indicating the "**tip**" and "**tail**" **points** of the vector

b) With a single lower case letter

2) We write the **Magnitude** of vectors with "absolute value bars"
(**KNOW YOUR CONTEXT**!)

e.g. The magnitude of $\vec{a}$ is given by

The magnitude of $\overrightarrow{AB}$ is

Concerning Magnitude

a) **Magnitude** is just a **number**

b) The **magnitude** of any vector is always positive (since it represents the **length** of the vector).

3) Two vectors $\vec{a}$ and $\vec{b}$ are said to be **equal** (or **equivalent**) if:

a)

b)

Pictures

4) A **scalar** is a (mathematical) quantity which can "scale" vectors (describing size)

Examples:

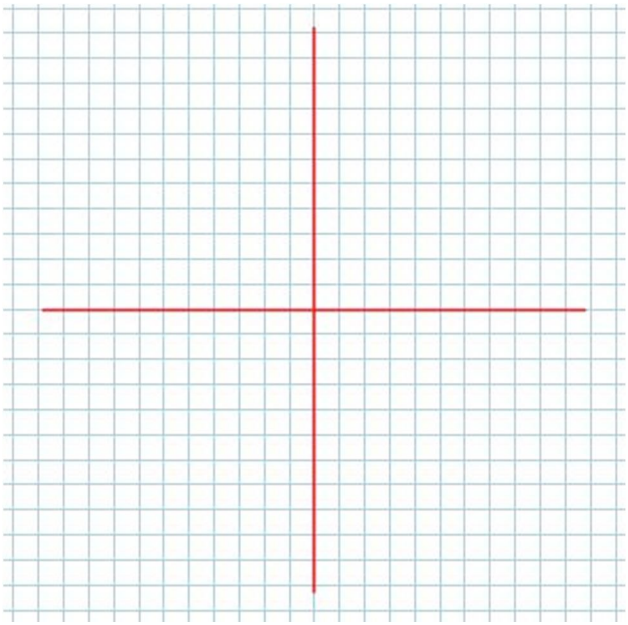
Magnitude is a

Speed is a

Velocity is a

Scalars can "stretch" or "shrink" vectors (in terms of magnitude).
Scalars can be negative.

Picture:



Comment

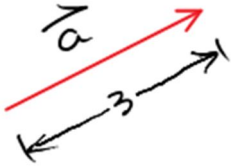
5) If $\vec{a} = -\vec{b}$, then we have that

a) $\vec{a}$ and $\vec{b}$ are pointing in opposite directions, but

b) $|\vec{a}| = |\vec{b}|$

We sometimes call $\vec{a}$ and $\vec{b}$

Example 6.1.1

Given the vector 

Draw a) $\vec{b}$ so that $|\vec{b}| = |\vec{a}|$ but $\vec{b} \neq \vec{a}$

b) $\vec{c}$ so that $\vec{c} = 2\vec{a}$

Example 6.1.2

Using a scale of $1cm = 5km/hr$ draw a vector which represents

$25km/hr \left[S 60^{\circ} E\right]$

Class/Homework for Section 6.1

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