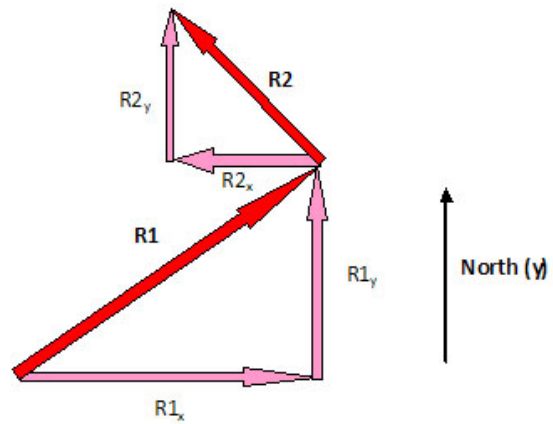
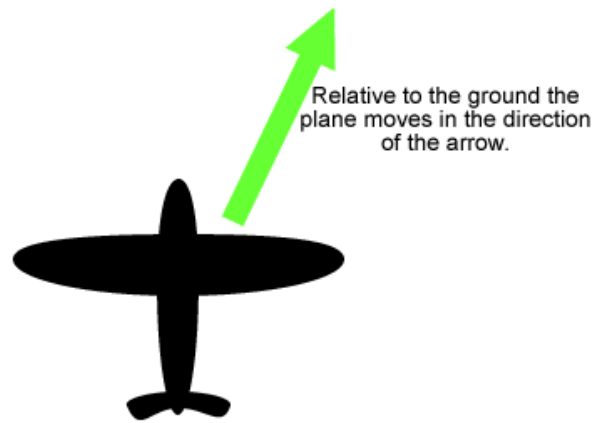
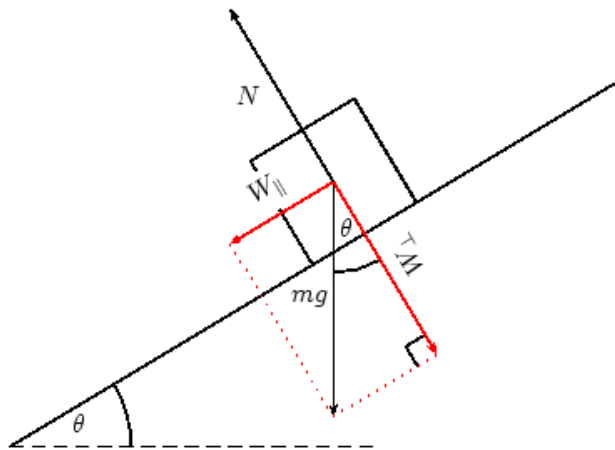


Physics 122

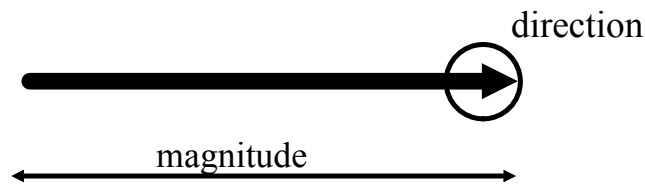
Applications of Vectors



VECTOR REVIEW

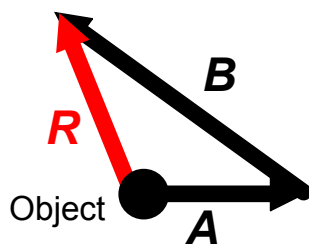
Vector quantities have both magnitude and direction. Some vector quantities are velocity, force, acceleration and momentum.

Vectors are represented by arrows.



Graphical Methods of Adding Vectors

Method 1: Tip-to-Tail



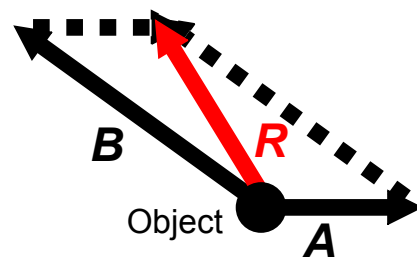
Online Applet
Kinematics-2D
Motion-Boat & River;
Relative Motion



R - resultant (sum of vectors)

Pro: Easier to solve.
Con: More difficult conceptually to picture.

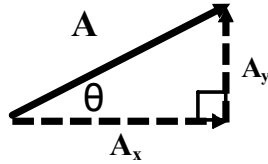
Method 2: Parallelogram



Pro: Easier to conceptually picture.
Con: More difficult to solve.

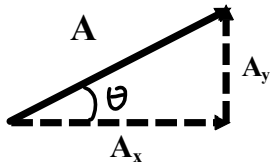
Components of a Vector

A vector can be expressed as the sum of two other vectors, called the components of the vector. The process of finding the components of a vector is called vector resolution. We will always be finding the perpendicular components of a vector.



Use trigonometric ratios to determine the magnitudes of the components. The arrows of the components show the directions.

$$\sin \theta = \frac{A_y}{A} \rightarrow \underline{A_y = A \sin \theta}$$



$$\cos \theta = \frac{A_x}{A} \rightarrow \underline{A_x = A \cos \theta}$$

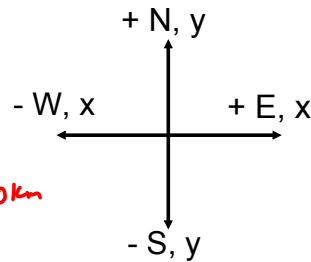
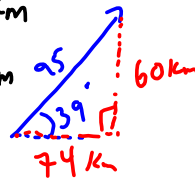
$$\tan \theta = \frac{A_y}{A_x}$$

Ex: Find the components of the following:

a) 95 km [E39°N]

East: $95 \cos 39 = 74 \text{ km}$

North: $95 \sin 39 = 60 \text{ km}$

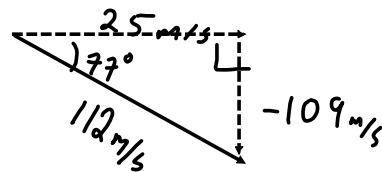


b) 112 m/s [E77°S]

East: $112 \cos 77 = 25 \text{ m/s}$

North: $-112 \sin 77 = -109 \text{ m/s}$

↑
South



c) 1575 m [W22°S]

East: $-1575 \cos 22 = -1460 \text{ m}$

↑
West

North: $-1575 \sin 22 = -590 \text{ m}$

↑
South

