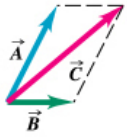
Physics 2A

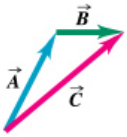
Vectors and Motion in Two Dimensions

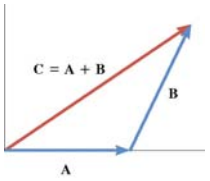
Adding Vectors Graphically

Parallelogram

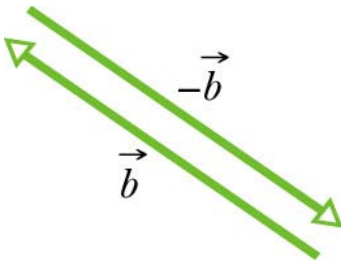


Tail-to-Tip



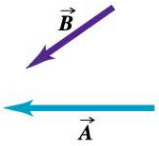


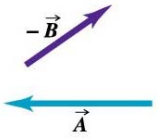
Vectors Subtraction



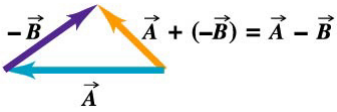
⇒ The negative of a vector has the same magnitude as the vector but the opposite direction.

Vectors Subtraction

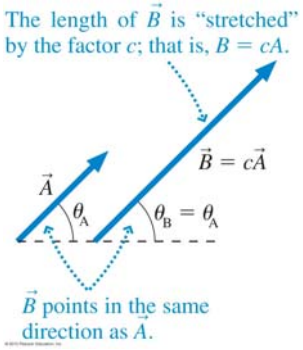




⇒ Subtracting a vector is the same as adding the negative of the vector.



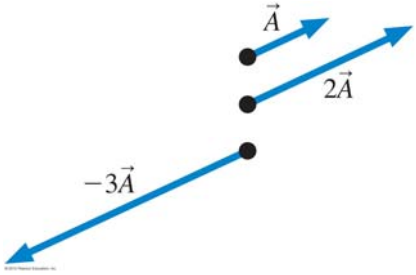
Multiplication by a Scalar



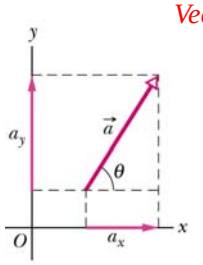
⇒ Multiplying a vector by a positive scalar gives another vector of different magnitude but pointing in the same direction.

Multiplication by a Scalar

⇒ Multiplying a vector by a negative scalar gives another vector of different magnitude and pointing in the opposite direction.

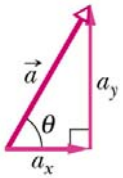


Vector Components



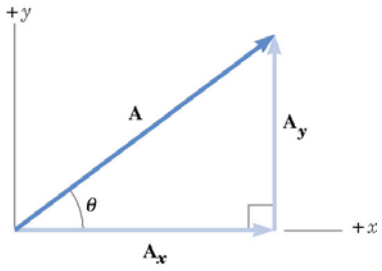
⇒ A component of a vector is really just a projection of the vector onto an axis.

⇒ Any vector can be expressed as the sum of its components.

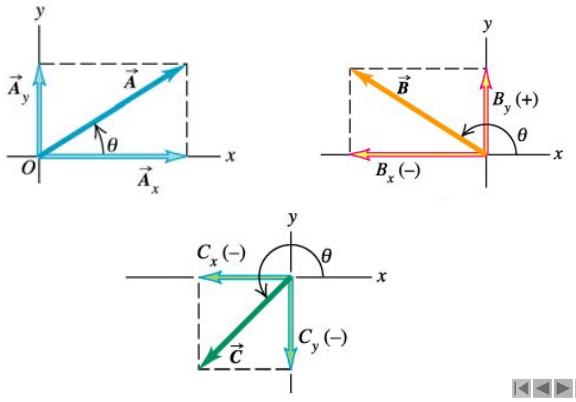


Vector Components

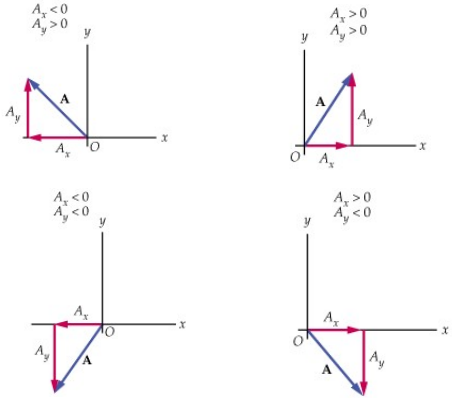
⇒ Components of a vector are two perpendicular vectors that add together to produce the original vector.



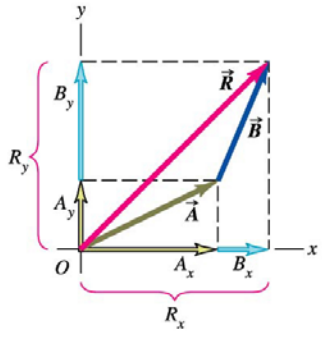
Vector Components



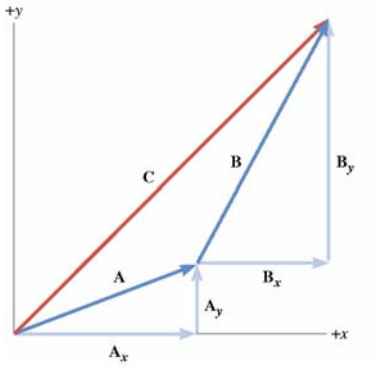
Vector Components



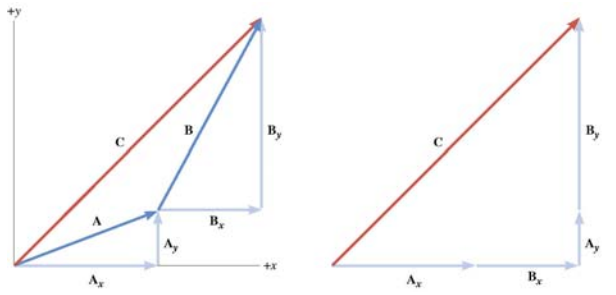
Adding Vector Using Components



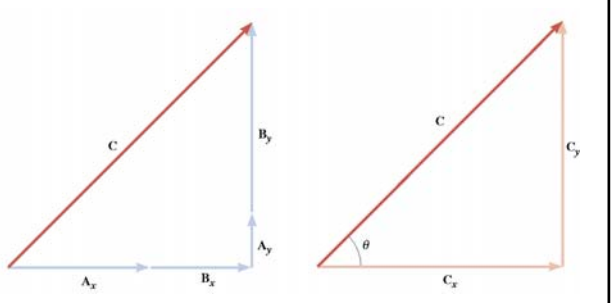
Adding Vector Using Components



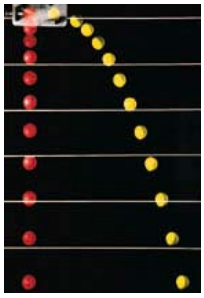
Adding Vector Using Components



Adding Vector Using Components

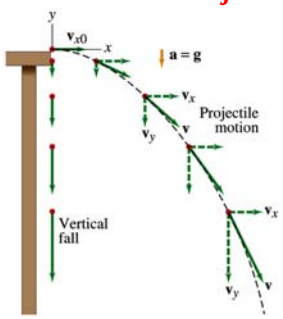


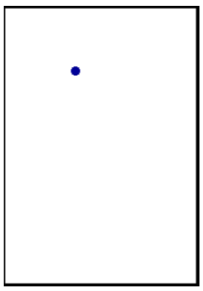
Projectile Motion



⇒ In projectile motion, the horizontal and vertical motions are independent of each other.

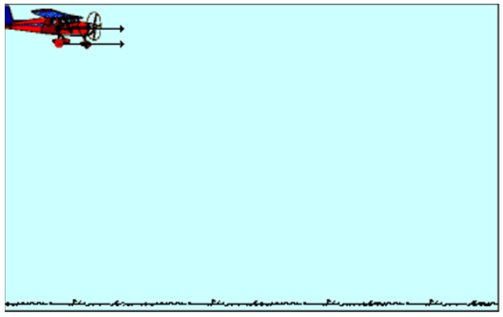
Projectile Motion



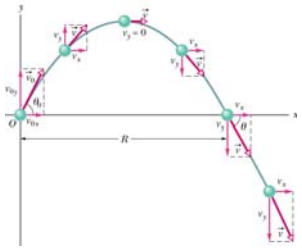


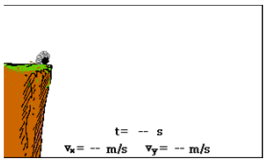
⇒ The horizontal and vertical motions can be treated separately because they are independent of each other.

Projectile Motion



Projectile Motion





v_x is constant, v_y changes by 9.8 m/s every second

Monkey-Hunter Problem