

### Key Concepts

1. Displacement ( $d \rightarrow$ ): Change in position
2. Velocity ( $v \rightarrow$ ): Rate of change of displacement. Has both magnitude and direction
  - a. Initial Velocity ( $v_i \rightarrow$ ): Velocity at the start of the time interval
  - b. Final Velocity ( $v_f \rightarrow$ ): Velocity at the end of the time interval.
3. Acceleration ( $a \rightarrow$ ): Rate of change of velocity.
4. Time ( $t \rightarrow$ ): Duration of motion
5. Gravity ( $g \rightarrow$ ): Acceleration due to gravity.  
 $g \rightarrow = 9.81 \text{m/s}^2$  on Earth
6. Projectile Motion: The motion of an object projected into the air, horizontal (x) and vertical (y)

### Vector Equations

$$v \rightarrow = d \rightarrow / t \text{ (if } a \rightarrow = 0)$$
$$v \rightarrow = \Delta d \rightarrow / t$$
$$v \rightarrow_{\text{ins}} = \Delta d \rightarrow / \Delta t$$
$$v \rightarrow_{\text{avg}} = d \rightarrow_{\text{total}} / t_{\text{total}}$$
$$v \rightarrow_{\text{avg}} = (v \rightarrow_i + v \rightarrow_f) / 2 \text{ (if } a \rightarrow = \text{constant)}$$
$$a \rightarrow = \Delta v \rightarrow \Rightarrow v \rightarrow_f = v \rightarrow_i + a \rightarrow t$$
$$d \rightarrow = ($$



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