

# KINEMATICS

## Kinematic Equations

- 👉 The kinematic equations are a set of four equations that can be utilized to predict unknown information about an object's motion if other information is known.
- 👉 The equations can be utilized for any motion that can be described as being either a constant velocity motion (an acceleration of 0 m/s/s) or a constant acceleration motion.
- 👉 They can never be used over any time period during which the acceleration is changing.
- 👉 Insert correct substitution for initial velocity when launching at an angle

$$d = V_i t + \frac{1}{2} a t^2$$

$$V_f = V_i + a t$$

$$V_f^2 = V_i^2 + 2 a d$$

$$d = \frac{V_i + V_f}{2} * t$$

- ✓ **D = displacement**, ( $\Delta x$ )
- ✓ **t = time**
- ✓ **a = acceleration**
- ✓  **$V_i = V_0 =$  Initial Velocity**
- ✓  **$V_f =$  Final Velocity**

## Projectile Motion Launched @ an Angle

- 👉 Horizontal =  $V_{ox} = V_{ix} = V_{ox} \cos \theta$
- 👉 Vertical =  $V_{oy} = V_{iy} = V_{oy} \sin \theta$

## Problem-Solving with Kinematic Equations

- 👉 Construct an informative diagram of the physical situation.
- 👉 Identify & list the given information in variable form.
- 👉 Identify and list the unknown information in variable form.
- 👉 Identify and list the equation that will be used to determine the unknown.
- 👉 Substitute known values into the equation and use appropriate algebraic steps to solve for the unknown.
- 👉 Plug in your answer to check for accuracy.