

# Physics Equations

## Adding Parallel Collinear Vectors

$$\begin{array}{ccc} \rightarrow & \rightarrow & \rightarrow \\ \Delta d_R = \Delta d_1 + \Delta d_2 \end{array}$$

## Difference in Displacement

$$\begin{array}{ccc} \rightarrow & \rightarrow & \rightarrow \\ \Delta d_R = \Delta d_2 - \Delta d_1 \end{array}$$

## Time and Periodic Motion

$$T = \frac{\Delta t}{N} \qquad T = \frac{1}{f}$$

$$f = \frac{N}{\Delta t} \qquad f = \frac{1}{T}$$

## Speed

$$V = \frac{\Delta d}{\Delta t} \qquad \text{or} \qquad \frac{d_2 - d_1}{t_2 - t_1}$$

## Average Speed

$$V_{av} = \frac{\Delta d}{\Delta t} \qquad \text{or} \qquad \frac{d_1 + d_2}{t_1 + t_2}$$

## Velocity

$$\begin{array}{ccc} \rightarrow & \rightarrow & \rightarrow \\ V = \frac{\Delta d}{\Delta t} \qquad \text{or} \qquad \frac{d_2 - d_1}{t_2 - t_1} \end{array}$$

### Average Velocity

$$\vec{V}_{av} = \frac{\Delta \vec{d}}{\Delta t} \quad \text{or} \quad \frac{\vec{d}_1 + \vec{d}_2}{t_1 + t_2}$$

### Acceleration

$$\vec{a} = \frac{\Delta \vec{V}}{\Delta t} \quad \text{or} \quad \frac{\vec{v}_2 - \vec{v}_1}{t_2 - t_1}$$

### Newton's Laws

$$\vec{F} = m \times \vec{a}$$

### Momentum

$$\vec{p} = m \times \vec{v}$$

### Impulse

$$\vec{I} = \vec{F} \times \Delta t$$

### m/s to km/h

$$1 \text{ m/s} = 3.6 \text{ km/h (Multiply by 3.6)}$$

### km/h to m/s

$$3.6 \text{ km/h} = 1 \text{ m/s (Divide by 3.6)}$$