

# EQUATION SHEET



## Linear Motion

$$\bar{v} = \frac{\Delta s}{\Delta t}$$

(average velocity)

$$\bar{v} = \frac{v_1 + v_0}{2}$$

(average velocity)

$$a = \frac{\Delta v}{\Delta t}$$

(acceleration)

$$v_1^2 = v_0^2 + 2a\Delta x$$

(sans time)

$$d = v_0 t + \frac{1}{2} a \Delta t^2$$

(distance)

$$v_1 = v_0 + a \Delta t$$

(motion)

$$x_1 = x_0 + v_0 \Delta t + \frac{1}{2} a \Delta t^2$$

(horizontal position)

$$y = mx + b$$

(y-intercept)

$$y_1 = y_0 + v_0 \Delta t + \frac{1}{2} a \Delta t^2$$

(vertical position)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

(slope)

## Forces

$$F = ma$$

$$w = mg$$

(weight)

$$F_N = mg$$

(normal force)

$$F_N = mg \cos \theta$$

(inclined plane)

$$F_s = \mu_s F_N$$

(static friction)

$$F_k = \mu_k F_N$$

(kinetic friction)

$$p = mv$$

(momentum)

$$Ft = \Delta p$$

(impulse)

$$\sum p_0 = \sum p_1$$

(conservation of momentum)

$$m_0 v_0 = m_1 v_1$$

(conservation of momentum)

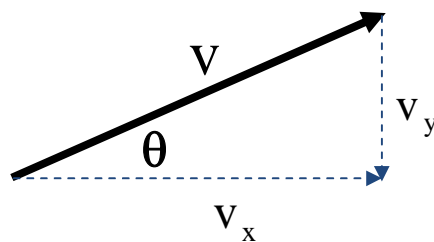
$$m_1 v_1 + m_2 v_2 = m_1 v_1 + m_4 v_4$$

(collision equation)

## Vector Components

$$v_x = v \cos \theta$$

$$v_y = v \sin \theta$$



## Work and Power

$$W = Fd$$

(work)

$$P = \frac{W}{t}$$

(power)

$$PE = mgh$$

(potential energy)

$$KE = \frac{1}{2}mv^2$$

(kinetic energy)

## Torque

$$\tau = F\ell$$

(torque)

$$\sum \tau_0 = \sum \tau_1$$

$$\tau_1 + \tau_2 + \dots = \tau_3 + \tau_4 + \dots$$

## Circular Motion

$$\Delta\theta = \frac{s}{r}$$

$$\omega = \frac{v}{\rho}$$

$$\omega = \frac{\Delta\theta}{\Delta t}$$

$$\alpha = \frac{\Delta\omega}{\Delta t}$$

$$\alpha = \frac{a}{r}$$

$$\omega_1 = \omega_0 + \alpha\Delta t$$

$$\theta_1 = \theta_0 + \omega_0\Delta t + \frac{1}{2}\alpha\Delta t^2$$

$$a_c = \frac{v^2}{r}$$

$$a_c = r\omega^2$$

$$F_c = \frac{mv^2}{r}$$

$$F_c = mr\omega^2$$

## Notes

**"I have learned that people will forget what you said, people will forget what you did, but they will never forget how YOU made them Feel"**

**-- Maya Angelou**