Kepler’s Laws

A close up of a text

Description automatically generated

A white paper with black text and red text

Description automatically generated

A white paper with black text and black text

Description automatically generatedA white background with black text

Description automatically generated

Gravitation

Rotation around rigid body



G =/ g

G same value for all location

G different location = different values

**Since W = mg**

A black text with a black line

Description automatically generated=> A black text on a white background

Description automatically generated



Escape Velocity Circular motion.

A math equation with a square and a line

Description automatically generated A math equations and formulas

Description automatically generated with medium confidenceA math equation with square root and square root

Description automatically generated



Angular Momentum

Rotation around rigid body

A red line drawn on a white surface

Description automatically generated

L = angular momentum

A white rectangular sign with black text

Description automatically generated

A text on a piece of paper

Description automatically generatedA math equations and formulas

Description automatically generated with medium confidenceA text on a white background

Description automatically generated

Terminal velocity

A close-up of a math problem

Description automatically generatedA black text on a white background

Description automatically generated

Air drags at high speed

A diagram of a mathematical equation

Description automatically generatedA screenshot of a cell phone

Description automatically generated

Rotational Dynamic

Torque

A close up of a sign

Description automatically generated

A math equation with numbers

Description automatically generated with medium confidence

* Torque is a vector.
* >= 2 force acting on rigid body, torque is positive is counter-CW, else negative if CW

Torque & angular acceleration.

A white background with a red rectangle and blue lines

Description automatically generated

Work, power, energy.

P = tw

A math equation with numbers and a red border

Description automatically generated A math equation with numbers and symbols

Description automatically generated

Torque vs force

A close up of a paper

Description automatically generated

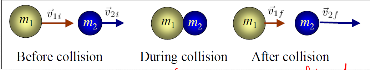
Static Equilibrium

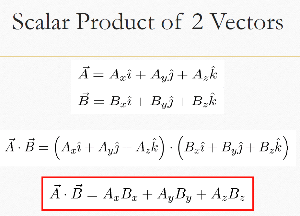
A diagram of a circle and a circle with arrows

Description automatically generated

A white rectangular box with black text

Description automatically generatedA white background with black text

Description automatically generatedA square root of a mathematical equation

Description automatically generated

Time present = use at

Else use ar (if ask for centipedal, use ar)

Arc length

Radial acceleration

tangent acceleration

Moment of Inertia for different objects

A group of math equations

Description automatically generated

A diagram of a cylinder

Description automatically generated

Moment of Inertia

A math equations on a white paper

Description automatically generated

A close up of text

Description automatically generated

Parallel axis theorem A text on a white background

Description automatically generated

Angular Motion (Rotational motion of body)

A white paper with black text

Description automatically generatedA math equations with red squares

Description automatically generated with medium confidence

Kinematics (Angular vs Linear)

A set of black symbols

Description automatically generated with medium confidence A math equations and formulas

Description automatically generated with medium confidence

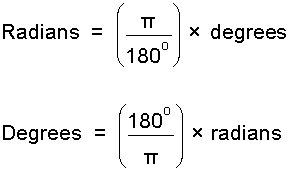
θ – θ0 = 1/2(ω0 + ω) t

A diagram of a hand and a hand pointing at a hand

Description automatically generated with medium confidenceA close up of words

Description automatically generated

θ => can be used to find m and angle/rad

A black text with a number

Description automatically generated

Centre of Mass (Shaped object)

Xcm = A math equation with plus and two symbols

Description automatically generated with medium confidence

Centre of Mass (System of particles)

A math equation with black letters and numbers

Description automatically generated with medium confidence

Centre of Mass (Extended Object)

A math equation with a red border

Description automatically generated

Characteristics of CM

A close up of a text

Description automatically generated

Centre of mass (Right angle triangle)

A square with black numbers and a red border

Description automatically generated A white rectangular sign with black text

Description automatically generated

Centre of mass (Cone)

A close up of a letter

Description automatically generated with medium confidence

Motion of system of particles

A diagram of a equation

Description automatically generatedA screenshot of a white paper with text

Description automatically generated

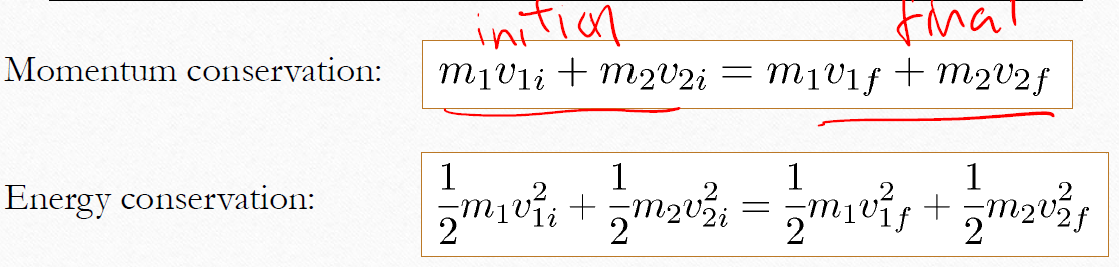
Momentum and Collision

P = mv (Momentum)

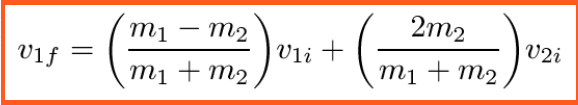
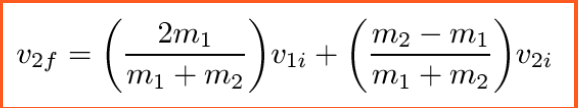
P = KE =

**Remember where all forces and momentum are present.**

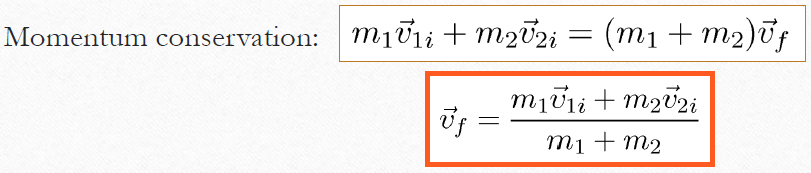
Elastic Collision



Final Velocity

Inelastic Collision



Inelastic Collision

**Momentum found at collision.**

Properties of conservative force

Force is independent of path.

Force at end = Force at start

Power

Pinst = mv(Momentum)

Pav = W/t

SI unit : Watt(W)

1 horsepower = 746W

1 kWh = 103 x 3600 W = 3.6 MJ

instantaneous power:

A math equation with arrows and symbols

Description automatically generated with medium confidence

Reminder

F = μmg = ma = mg

J = F x T

Work Done

**W = F . S(Constant)(SI: J)**

**W = KE = ½mv^2(Kinetic)**

**W = GPE = mg**

**h (Gravitational)**

**W = SE = ½kx^2(Spring)**

**W = KE = ½mv^2­­f – ½v^2i**

**W = KEf + GPEf = KEi + GPEi**

**(Same idea for GPE & SE when displacement occur)**

**Momentum from start and end is the same(conserved)** 

**Mechanical energy (ME) = KE = GPE = SE**

A math formula with text

Description automatically generated with medium confidenceA white paper with writing on it

Description automatically generated

**I =½**MR^2

Application of Newton’s Laws

**Uniform Circular motion** **Negotiating a Curve**

A white rectangular object with black text

Description automatically generated A square root of a square

Description automatically generated

**Negotiating a Bank Curve Non-Uniform Circular**

**Motion**

A math equation with black letters

Description automatically generated with medium confidence A math equation with a red border

Description automatically generated