AP Physics 1: Cheat Sheet

Unit 1: Kinematics

- **Ecological Relationships**
  - **Vector vs. Scalar:** Vectors include directions.
  - **Displacement vs. Distance**
  - **Velocity vs. Speed:** Include direction for velocity.
  - **Acceleration:** (also a vector)
  - **Key Equations:**
  - $v = v_0 + at$
  - $\Delta x = v_0 t + \dfrac{1}{2} a t^2$
  - $v^2 = v^2_0 + 2a\Delta x$
  - $\Delta x = \dfrac{1}{2}(v_0 + v)t$
  - Projectile Motion
  - **Position-Time Graphs:** Slope = velocity
  - **Velocity-Time Graphs:** Slope = acceleration
  - **Acceleration-Time Graphs**
  - **Gravity:** Gravity: g=9.8 m/s²

Additional Notes:

Examples.com

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Unit 2: Dynamics

- **Equilibrium:** Net force = 0
- **Newton's Laws:**
- **1st:** Law of Inertia
- **2nd:** F = ma
- **3rd:** Action-Reaction
- **Friction:** $F_f = uF_n$
- **Ramps/Inclined Planes:** Free body diagrams
- Force Body Diagrams
- Net Force Calculation

Additional Notes:

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Unit 3: Circular Motion & Gravitation

- **Centripetal Force:** Not an actual force, net force $F_c = \dfrac{mv^2}{r}$
- **Centripetal Acceleration:** $a_c = \dfrac{v^2}{r}$
- **Universal Gravitation:** $F = G\dfrac{m_1 m_2}{r^2}$
- **Uniform Circular Motion:** Constant speed
- **Gravitational Mass vs. Inertial Mass**

Additional Notes:

Unit 4: Energy

- **Work:** W = FdParallel: (+) Work

- **Antiparallel:** (−) Work

- **Energy Types:** Kinetic Energy: $KE = \dfrac{1}{2}mv^2$

- **Potential Energy:** $PE_g = mgh$, $PE_s = \dfrac{1}{2}kx^2$

- **Mechanical Energy:** Sum of kinetic and potential energy

- **Power:** $P = \dfrac{W}{t}$ or $P = Fv$

- **Conservation of Energy**

- **Graphs & Diagrams**

Additional Notes:

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Unit 5: Momentum

- **Momentum:** p = mv

- **Impulse:** ΔP = J

- **Conservation of Momentum**

- **Collisions:** Elastic: Kinetic Energy and Momentum conserved

- **Inelastic:** Momentum conserved

- **Center of Mass**

Additional Notes:

Ex Examples.com

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Unit 6: Simple Harmonic Motion

- **Spring & Pendulum**

- **Key Relationships:Hooke's Law: F =** kx

- **Period Equations:Pendulum:** $(T = 2\pi\sqrt{\dfrac{L}{g}}$

- **Spring:** $(T = 2\pi\sqrt{\dfrac{m}{k}})$

Additional Notes:

Ex Examples.com

AP Physics 1: Torque & Rotational Motion

Unit 7: Torque & Rotational Motion

- **Rotational Kinematics:** θ,ω,αSimilar to linear kinematics with rotational symbols

- **Torque:** t = Iα

- **Moment of Inertia:** I = Σmr²

- **Angular Momentum:** L=Iω

- **Conservation of Angular Momentum**

Additional Notes:

Ex **Examples.com**