

ISP 209

Equation Sheet for Exam 1

- Constant acceleration

$$v = at \quad \text{or} \quad v = v_0 + at$$

$$D = \frac{1}{2}at^2 \quad \text{or} \quad D = v_0t + \frac{1}{2}at^2$$

For free fall: distance fallen = $\frac{1}{2}gt^2$

- Momentum. The definition of *momentum* is $p = m v$.

- Circular motion

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

- Gravity

$$W = mg$$

$$F = \frac{GM_1M_2}{r^2}$$

- Newton's second law

$$F = ma \quad \text{where} \quad a = \frac{\Delta v}{\Delta t}$$

- Orbits of the planets

$$T^2 \propto a^3 \quad \text{arbitrary units}$$

$$T^2 = a^3 \quad (\text{period in } y; \text{ semi - major axis in AU})$$

- Gravitational constants

$$g = 9.81 \text{ m/s}^2$$

$$G = 6.67 \times 10^{-11} \text{ m}^3\text{s}^{-2}\text{kg}^{-1}$$