

The Equations

1-D Kinematics → Causes of Force

$$\Delta x = x - x_0$$

$$\bar{v} = \frac{x - x_0}{t}$$

$$a = \frac{v - v_0}{t}$$

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

$$v = v_0 + at$$

$$\Delta x = vt - \frac{1}{2}at^2$$

$$\Delta x = v_0t + \frac{1}{2}at^2$$

$$\Delta x = \frac{1}{2}(v + v_0)t$$

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

$$\Delta x = v_{0x}t$$

$$v_y = v_{0y} - gt$$

$$\Delta y = v_{0y}t - \frac{1}{2}gt^2$$

$$v_y^2 = v_{0y}^2 - 2g\Delta y$$

$$\Delta y = v_yt + \frac{1}{2}gt^2$$

$$y = \tan\theta x - \frac{g}{2v_0^2 \cos^2\theta} x^2$$

$$\Sigma F = ma$$

$$G = mg$$

$$f = \mu_{s,k}N$$

$$F = -G \frac{m_1 m_2}{r^2}$$

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

$$ma_R = m \frac{v^2}{r}$$

$$f = \frac{1}{\tau}$$

$$v = \frac{2\pi r}{\tau}$$

$$v = 2\pi r f$$

$$F = k \frac{q_1 q_2}{r^2}$$

$$P = \frac{F}{A}$$

The Constants

1-D Kinematics → Causes of Force

$$m_{Earth} = 5.98 \times 10^{24} \text{ kg}$$

$$m_{Moon} = 7.35 \times 10^{22} \text{ kg}$$

$$m_{Sun} = 1.99 \times 10^{30} \text{ kg}$$

$$g_{Earth's \text{ Surface}} = 9.802 \text{ m/s}^2$$

$$r_{Earth} = 6.38 \times 10^6 \text{ m}$$

$$r_{Moon} = 1.74 \times 10^6 \text{ m}$$

$$r_{Sun} = 6.96 \times 10^8 \text{ m}$$

$$k = 8.988 \times 10^9 \frac{N \cdot m^2}{C^2}$$

$$d_{Earth-Moon} = 3.84 \times 10^8 \text{ m}$$

$$d_{Earth-Sun} = 1.496 \times 10^{11} \text{ m}$$

$$G = 6.67 \times 10^{-11} \frac{N \cdot m^2}{kg^2}$$