

Provided Formulas:

$$\bar{v} = \frac{\Delta x}{\Delta t} \quad \bar{v} = \frac{v + v_0}{2} \quad v = v_0 + at \quad a = \frac{\Delta v}{\Delta t}$$

$$\Delta x = v_0 t + \frac{1}{2} at^2 \quad \Sigma F = ma \quad \Sigma F = \text{Vector sum of forces}$$

$$W = mg \quad F_{fr} = \mu F_N$$

$$a_{\text{uniform circle}} = \frac{v^2}{r} \quad \Sigma F_{\text{uniform circle}} = \frac{mv^2}{r}$$

$$F_{\text{gravity}} = G \frac{Mm}{r^2} \quad G = 6.67 \times 10^{-11} \frac{\text{Nm}^2}{\text{kg}^2}$$

$$\frac{T_A^2}{T_B^2} = \frac{r_A^3}{r_B^3} \quad W = Fd \quad P = \frac{W}{t} \quad W_{\text{net}} = \Delta KE$$

$$KE = \frac{1}{2} mv^2 \quad PE_{\text{grav}} = mgh \quad PE_{\text{spring}} = \frac{1}{2} kx^2$$

$$F_{\text{spring}} = -kx \quad KE_i + PE_i + W_{nc} = KE_f + PE_f$$

Not always present can be grav, spring, or both

Not Provided, but helpful to know or be able to derive:

$$g = \frac{GM}{r^2} \quad v = \sqrt{\frac{GM}{r}}$$