University Physics 1 and 1A: Equation Sheet for Exam 2

Equations

$x = x_o + v_{ox}t + \frac{1}{2}a_x t^2$

$v = v_{ox} + a_x t$

$v_x^2 = v_{ox}^2 + 2a_x(x - x_o)$

$x - x_o = \frac{1}{2}(v_{ox} + v_x)t$

$a_{centripetal} = \frac{v^2}{r}$

$\sum \vec{F} = m\vec{a}$

$f_s \leq \mu_s \left| \vec{N} \right|$

$f_k = \mu_k \left| \vec{N} \right|$

for a quadratic equation of the form

$0 = ax^2 + bx + c$

$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Uncertainties

Addition or Subtraction: For $Q = x + y - z + C_1$

$$\Delta Q = \Delta x + \Delta y + \Delta z$$

Multiplication or Division: For $Q = C_1 xy/z$

$$\frac{\Delta Q}{Q} = \frac{\Delta x}{x_{avg}} + \frac{\Delta y}{y_{avg}} + \frac{\Delta z}{z_{avg}}$$

Powers: For $Q = C_1 x^m y^n$

$$\frac{\Delta Q}{Q} = |m|\frac{\Delta x}{x_{avg}} + |n|\frac{\Delta y}{y_{avg}}$$

For other functions, follow the general rule—pick values to make Q as large as possible then subtract the average value of Q.

Units and Constants

$g = 9.8 \text{ m/s}^2 = 32 \text{ ft/s}^2$

$60 \text{ mph} = 88 \text{ ft/s}$

$1 \text{ mile} = 1609 \text{ m}$

$1 \text{ inch} = 2.54 \text{ cm}$