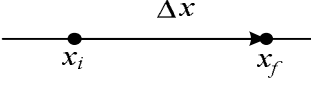


Formula Sheet (1st Midterm)

| Formulas | Variables and constants | Variables and constants | Picture or description |
|--|---|--------------------------|--|
| *example* $\Delta x \equiv x_f - x_i$ | Δx : displacement x_f : final position | x_i : initial position |  <p>A horizontal line with a dot at the left end labeled x_i and a dot at the right end labeled x_f. A double-headed arrow above the line spans the distance between the two dots, labeled Δx.</p> |
| $\bar{v} \equiv \frac{\Delta x}{\Delta t} = \frac{x_f - x_i}{t_f - t_i}$ | | | |
| $\bar{a} \equiv \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{t_f - t_i}$ | | | |
| $v = v_0 + at$ | | | |
| $\Delta x = v_0 t + \frac{1}{2} at^2$ | | | |
| $v^2 = v_0^2 + 2a\Delta x$ | | | |
| $v_x = v_{0x} = v_0 \cos \theta_0 = \text{const.}$ | | | |
| $\Delta x = v_{0x} t = (v_0 \cos \theta_0) t$ | | | |
| $v_y = v_0 \sin \theta_0 - gt$ | | | |
| $\Delta y = (v_0 \sin \theta_0) t - \frac{1}{2} gt^2$ | | | |
| $v_y^2 = (v_0 \sin \theta_0)^2 - 2g\Delta y$ | | | |
| $\vec{v}_{AB} = \vec{v}_{AE} - \vec{v}_{BE}$ | | | |
| $\sum \vec{F} = m\vec{a}$ | | | |
| $F_g = G \frac{m_1 m_2}{r^2}$ | | | |
| $w = mg$ | | | |
| $\vec{F}_{12} = -\vec{F}_{21}$ | | | |

| | | | |
|--------------------|--|--|--|
| $f_s \leq \mu_s n$ | | | |
| $f_k = \mu_k n$ | | | |

Appendix

Surface area of sphere = $4\pi r^2$; Area of circle = πr^2
M (mega) $\times 10^6$; k (kilo) $\times 10^3$; m (milli) $\times 10^{-3}$; μ (micro) $\times 10^{-6}$