Formula-sheet: Exam 1

==

- *For constant acceleration $\vec{a}$:*

$$\vec{v} = \vec{v}_0 + \vec{a}t \qquad v_x^2 = v_{x0}^2 + 2a_x(x - x_0)$$

$$\vec{r} = \vec{r}_0 + \vec{v}_0 t + \frac{1}{2}\vec{a}t^2 \qquad v_y^2 = v_{y0}^2 + 2a_y(y - y_0)$$

  Acceleration due to gravity: $g = 9.8m/s^2 = 32ft/s^2$ vertically down.

- *For force acting on a body of mass m:* $\vec{F} = m\vec{a}$

- Frictional forces: $f_{s,max} = \mu_s N$; $f_k = \mu_k N$. N : normal force.

- *For uniform circular motion:* centripetal acceleration is $a_c = \frac{v^2}{r}$

- Kinetic energy: $K = \frac{1}{2}mv^2$

- Work done by a constant force: $W = \vec{F} \cdot \vec{d} = Fd\cos(\text{angle between } \vec{F} \text{ and } \vec{d})$.

- Work-kinetic energy theorem: $W = K_f - K_i$

- Vectors (2d): $\vec{A} = \hat{i}A_x + \hat{j}A_y$; $A = \sqrt{A_x^2 + A_y^2}$;

  $A_x = A\cos(\text{angle between } \vec{A} \text{ and } \hat{i})$; $A_y = A\sin(\text{angle between } \vec{A} \text{ and } \hat{i})$.

==