PHYS101 First Major Exam Formula Sheet

$y = c\,x^n$; $dy/dx = cn\,x^{n-1}$

Motion in One Dimension

Motion with Constant Acceleration

Free Fall

$a = -g$; $g = 9.8\ m/s^2$

Vectors

$\bar{a} \cdot \bar{b} = a\,b\cos\theta$, $|\bar{a} \times \bar{b}| = a\,b\sin\theta$

Motion in Two Dimensions

Projectile Motion

$a_x = 0$	$(x-x_0) = V_0\,t\cos\theta_0$
$a_y = -g$	$(y-y_0) = V_0\,t\sin\theta_0 - \frac{1}{2}gt^2$
$H = V_0^2\sin^2\theta_0/2g$	$R = V_0^2\sin 2\theta_0/g$

Uniform Circular Motion

Relative Motion

$\bar{V}_{PA} = \bar{V}_{PB} + \bar{V}_{BA}$

$\bar{V}_{AB}$ = Velocity of A relative to B = $-\bar{V}_{BA}$

Newton's Second Law

$\Sigma\,\bar{F} = m\,\bar{a} \Leftrightarrow$; $\Sigma F_y = m a_y$

Friction

$f_{s,max} = \mu_s N$; $f_k = \mu_k N$