Formulae and Definitions:	
Vectors:	$\mathbf{A} = A_x\mathbf{i} + A_y\mathbf{j} + A_z\mathbf{k}$
Scalar Product ("Dot" Product)	$\mathbf{A}\cdot\mathbf{B} = A_xB_x + A_yB_y + A_zB_z = AB\cos\theta_{\mathbf{A},\mathbf{B}}$ $= AB_{//} = A_{//}B$
Kinematics:	
the "motion" i.e. position as function of time	$\mathbf{s} = \mathbf{s}(t)$ (position vector)
velocity	$\mathbf{v} \equiv d\mathbf{s}/dt$ (speed $\equiv \lvert\mathbf{v}\rvert$)
acceleration	$\mathbf{a} \equiv d\mathbf{v}/dt$
Linear Kinematics for **CONSTANT a** (formulae follow directly from definitions!)	$\mathbf{v} = \mathbf{v}_0 + \mathbf{a}t,$ $\mathbf{s} = \mathbf{s}_0 + \mathbf{v}_0 t + \frac{1}{2}\mathbf{a}t^2;$ eliminating t: $v^2 = v_0^2 + 2\mathbf{a}\cdot(\mathbf{s} - \mathbf{s}_0)$
Angle θ (in radians):	$\theta \equiv s/R$ (=arc length/arc radius)
Angular velocity ω; angular acceleration α:	$\omega \equiv v_s/R$; $\alpha \equiv a_s/R$ ($_s$ = along arc)
Circular motion with **CONSTANT** α, radius R:	$\omega = \omega_0 + \alpha t;$ $\theta = \theta_0 + \omega_0 t + \frac{1}{2}\alpha t^2;$ eliminating t: $\omega^2 = \omega_0^2 + 2\alpha(\theta - \theta_0)$
Circular motion → centripetal acceleration:	$a = a_c = a_{rad} = v_s^2/R$ (inwards)
Force and its consequences:	$\Sigma\mathbf{F}_i = m\mathbf{a}$ and $\mathbf{F}_{A\ on\ B} = -\mathbf{F}_{B\ on\ A}$
Examples of forces:	
Force of **Gravity** between M and m, at center-to-center distance r: • Gravity *outside* a *spherically symmetric* distribution is like that of a point mass… • Gravity *inside* a *spherically symmetric* distribution is zero!	$\mathbf{F}_G = GMm/r^2$ (attractive!) G=6.67×10^{-11} Nm^2/kg^2); Near sea level: $\mathbf{F}_G = mg(-\mathbf{j})$ (downwards; g=9.80 m/s^2)
Force of a spring (spring constant k):	$\mathbf{F}_S = -k\mathbf{x}$ (opposes displacement $\mathbf{x}$)
Force of Friction: Note: static friction and the Normal force are **reaction** forces…	Static Friction: $F_f \le \mu_s N$ Kinetic friction: $F_f = \mu_k N$ μ=coef. of friction; N=normal force Direction: parallel to surface and opposite to the motion
Equilibrium:	$\Sigma\mathbf{F}_j = 0$
Differentiation formulae	
Integration formulae	