Trigonometry (*For right triangle with sides Adjacent, Opposite, and Hypoteneuse):*

Sin(θ) = O/H *Cos(θ) = A/H* *Tan(θ) = O/A* *$H^2 = O^2 + A^2$* *$A_{circle} = \pi r^2$*

Sin(30°) = Cos(60°) = ½ *Sin(60°) = Cos(30°) =$\sqrt{3}/2$ ~=0.866* *Sin(45°) = Cos(45°) = $\sqrt{2}/2$ ~0.707*

Sin(0°) = Cos(90°) = 0 *Sin(90°) = Cos(0°) = 1*

Kinematics:

$\langle \vec{v} \rangle = \frac{\Delta \vec{r}}{\Delta t}$ $\langle \vec{a} \rangle = \frac{\Delta \vec{v}}{\Delta t}$ $\vec{r}(t) = \overrightarrow{r_0} + \overrightarrow{v_o}t + \frac{1}{2}\vec{a}t^2$ $v(t)^2 = {v_o}^2 + 2\vec{a} \cdot \Delta\vec{r}(t)$

Newton's Laws:

$\sum \overrightarrow{F} = m\vec{a}$ $\overrightarrow{F_{AB}} = -\overrightarrow{F_{BA}}$

Forces:

$F_G = mg$ (@ surface) $f_s^{MAX} = \mu_s F_N$ $f_k = \mu_k F_N$

$F_C = ma_c = \frac{mv^2}{r}$ $F_{spring} = -kx$

Work & Energy:

$KE_{trans} = \frac{1}{2}mv^2$ $\Delta KE = W_{net}$ $PE_G = mgh$ $PE_{spring} = \frac{1}{2}kx^2$

E = KE + PE $\Delta E = W_{nc}$ $W = \overrightarrow{F} \cdot \Delta\vec{r} = \left|\vec{F}\right|\left|\Delta\vec{r}\right| \cos\theta_{Fdr}$

Rotational Motion:

$\theta = s/r$ $a_c = \frac{v^2}{r}$