Projectile Motion

The vector equation of the path for ideal projectile motion is:

$$r = (v_0 \cos \alpha)t\mathbf{i} + \left((v_0 \sin \alpha) - \frac{1}{2}gt^2\mathbf{j}\right)$$

v_0 is the initial speed. α is the launch angle. g is gravity.

Projectile Motion:

Max Height= $\frac{(v_0 \sin(\theta))^2}{2g}$

Range= $\frac{v_0^2 \sin(2\theta)}{g}$

Flight time= $\frac{2v_0 \sin(\theta)}{g}$