Equation Sheet for 2D Acceleration Problems

**Variables**

1 Dimension 2 Dimensions

$∆x$ $D\_{x}$ $D\_{y}$

$v\_{i}$ $v\_{i,x}$ $v\_{i,y}$

$v\_{f}$ $v\_{f,x}$ $v\_{f,y}$

$a$ $a\_{x}$ $a\_{y}$

$∆t$ $∆t$

**Equations**

Generic Equation Initial Velocity Final Velocity

$v\_{x}=v∙cos⁡(θ)$ $v\_{i,x}=v\_{i}∙cos⁡(θ)$ $v\_{f,x}=v\_{f}∙cos⁡(θ)$

$v\_{y}=v∙sin⁡(θ)$ $v\_{i, y}=v\_{i}∙sin⁡(θ)$ $v\_{f,y}=v\_{f}∙sin⁡(θ)$

1 Dimension Equation 2 Dimensions – X Direction 2 Dimensions – Y Direction

$∆x=\frac{1}{2}(v\_{i}+v\_{f})∆t$ $D\_{x}=\frac{1}{2}(v\_{i, x}+v\_{f,x})∆t$ $D\_{y}=\frac{1}{2}(v\_{i, y}+v\_{f,y})∆t$

$v\_{f}=v\_{i}+a∆t$ $v\_{f,x}=v\_{i,x}+a\_{x}∆t$ $v\_{f,y}=v\_{i,y}+a\_{y}∆t$

$∆x=v\_{i}∆t+\frac{1}{2}a\left(∆t\right)^{2}$ $D\_{x}=v\_{i,x}∆t+\frac{1}{2}a\_{x}\left(∆t\right)^{2}$ $D\_{y}=v\_{i,y}∆t+\frac{1}{2}a\_{y}\left(∆t\right)^{2}$

$v\_{f}^{2}=v\_{i}^{2}+2a∆x$ $v\_{f,x}^{2}=v\_{i,x}^{2}+2a\_{x}D\_{x}$ $v\_{f,y}^{2}=v\_{i,y}^{2}+2a\_{y}D\_{y}$