# ***Vertical Displacement Equation***

## *Vertical Velocity Equation:*

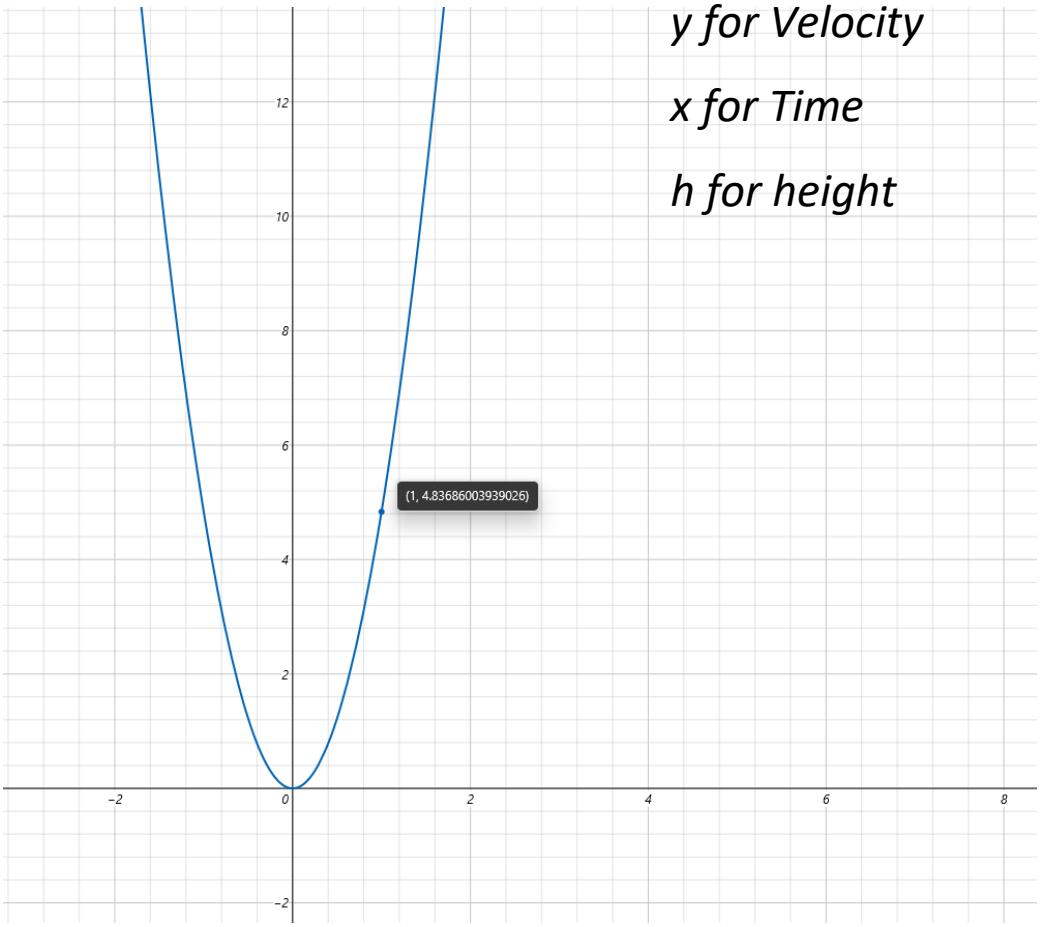
$$y = \frac{\sqrt{gkm} \times (1 - e^{-\frac{2x\sqrt{gkm}}{m}})}{(e^{\frac{-2x\sqrt{gkm}}{m}} + 1) \times k}$$

## *Displacement:*

$$h = \int \frac{\sqrt{gkm} \times \left(1 - e^{-\frac{2x\sqrt{gkm}}{m}}\right)}{\left(e^{\frac{-2x\sqrt{gkm}}{m}} + 1\right) \times k} d(x)$$

$$h = -\frac{m \ln(e^{-\frac{2x\sqrt{gkm}}{m}} + 1)}{2k}$$

$$h = \frac{m\,(\ln(e^{-\frac{2x\sqrt{gkm}}{m}} + 1)) + x\sqrt{gkm})}{k} - 81{,}7709753166429$$




*y for Velocity*

*x for Time*

*h for height*