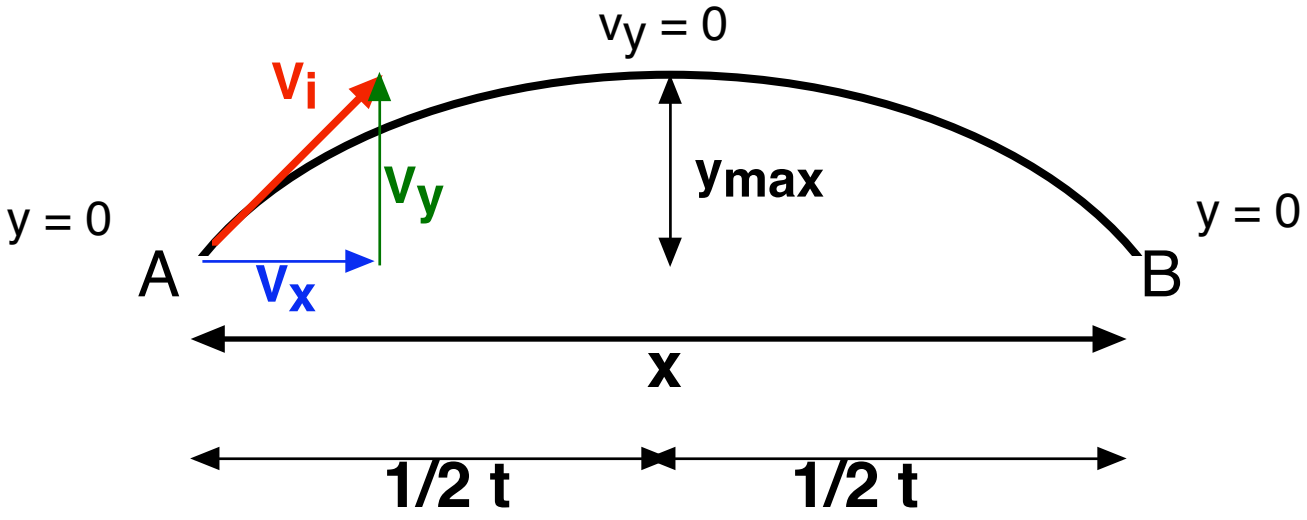
Projectiles launched at an angle



Assumptions:

- after launch, the only acceleration is g
- there is no air resistance
- v_y changes, and reaches zero at the apex of the parabola. v_y at B is the same magnitude as at A
- v_x remains constant
- time is symmetrical about the apex of the parabola
- points A and B are horizontally opposed

Formulas:

$$v_y = \frac{-gt}{2} \qquad v_y = v_i \sin\theta \qquad v_x = \frac{x}{t} \qquad v_x = v_i \cos\theta$$

$$v_i = \frac{\sqrt{-gx}}{2(\sin\theta\cos\theta)} \qquad t = \frac{2v_y}{g} \qquad t = \frac{x}{v_x}$$