

Projectile Calculator

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Equations

We need initial velocity and launch angle to run this calculator. Using the following formulas, we can get the final answers:

Time of flight,

$$T = \frac{2v_0 \sin \theta}{g} \quad (1)$$

Maximum Height Reached,

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

Horizontal Range,

$$R = \frac{v_0^2 \sin 2\theta}{g} \quad (3)$$

We derived these equations using fundamental kinematic equations:

Horizontal Distance,

$$x = V_x t \quad (4)$$

Horizontal Velocity,

$$V_x = V_{x0} \quad (5)$$

Vertical Distance,

$$y = V_0 t - \frac{1}{2} g t^2 \quad (6)$$

Vertical Velocity,

$$V_y = V_{y0} - g t \quad (7)$$

where,
 V_x is the velocity along x-axis,
 V_{x0} is the initial velocity along x-axis,
 V_y is the velocity along y-axis,
 V_{y0} is the initial velocity along y-axis.
 g is the acceleration due to gravity
 V_0 is the initial Velocity,
 \sin is the component along y-axis,
 \cos is the component along x-axis
 t is the time taken.

