The Parabolic Path of a Projectile.

The proof, usually given, that the path of a projectile *in vacuo* is a parabola, assumes the equivalent of the equation to a parabola referred to a tangent and the diameter through the point of contact as axes.

The following proof * requires only the theorem, $PN^2 = 4AS.AN$.

Let A be the highest point of the path of the projectile.

Let P be the position of the projectile at time t after the moment of projection ; $V\cos\alpha$, $V\sin\alpha$ the horizontal and vertical components of the initial velocity.

Let a vertical line through A and a horizontal line through P meet in N.

Then

vertical component of velocity at time $t = V\sin\alpha - gt$,

and time required to travel the path $AP = \dfrac{V\sin\alpha - gt}{g}$;

$$\therefore \quad PN = \frac{V\cos\alpha(V\sin\alpha - gt)}{g}$$

$$\text{and} \quad AN = \frac{(V\sin\alpha - gt)^2}{2g};$$

$$\therefore \quad PN^2 = \frac{2V^2\cos^2\alpha}{g}.AN. \qquad \therefore \text{ etc.}$$

* Given to me by J. G. Gibson, one of my pupils.—P.P.

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