

Parabolic Trajectory

Blue dashed curve is a parabola.

The equations for the vertical motion of the monkey is $y = h - \frac{1}{2}gt^2$, where g denotes the acceleration of gravity, t for elapsed time, and h for the initial height of the monkey.

The equations for the vertical motion of the hunter's dart is $y = V_{y0}t - \frac{1}{2}gt^2$, where V_{y0} denotes the initial vertical speed of the dart.

The term $\frac{1}{2}gt^2$ is both present on both sides of the equation, which then can be simplified to $V_{y0}t = h$, and simply solved.

