Source: [KBe2020math401flo2]

- Galileo's Inclined Plane

    - rolling a ball down the ramp
    - picture shows where the ball after each moment.
    - snapshots taken at constant rate
    - We can figure out the instantaneous speed
    - Equ is $y = 32x^2$
    - Derivative is $y = 32(x + d)^2 - 32x^2$

- "Instantaneous speed as a function"

$$y = \frac{a(x+h)^2 - ax^2}{h}$$
$$= \frac{a(x^2 + h^2 + 2xh) - ax^2}{h}$$
$$= \frac{ax^2 + ah^2 + 2axh - ax^2}{h}$$
$$= \frac{\cancel{ax^2} + axh^2 + 2ah - \cancel{ax^2}}{h}$$
$$= \frac{ah^{\cancel{2}} + 2ax\cancel{h}}{\cancel{h}}$$
$$= a\cancel{h}^{\;0} + 2ax$$