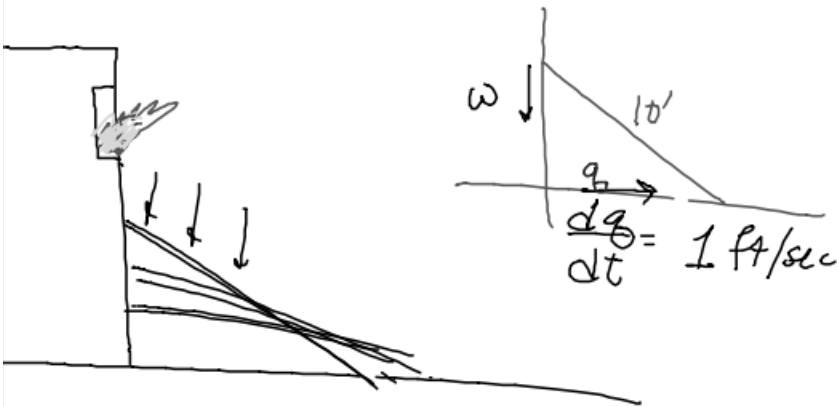


# Related Rates

The Falling Ladder: 1 ft/sec



The base of a 10 foot ladder is moving away from a wall at a speed of 1 foot per second.

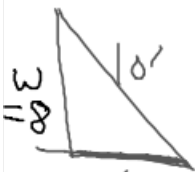
How fast is the top of the ladder traveling when the base is 6 feet from the wall?

rate:  $\frac{dw}{dt} = ?$

$$\frac{d}{dt}(q^2 + w^2) = (10^2) \frac{d}{dt}$$

$$2q \frac{dq}{dt} + 2w \frac{dw}{dt} = 0$$

6 = 1      8 ?



$$w^2 + 6^2 = 10^2$$

$$w^2 = 100 - 36$$

$$w^2 = 64$$

$$\underline{w = 8}$$

$$2 \cdot 6 \cdot 1 + 2 \cdot 8 \cdot \frac{dw}{dt} = 0$$

$$12 + 16 \cdot \frac{dw}{dt} = 0$$

$$\frac{16 \frac{dw}{dt}}{16} = \frac{-12}{16}$$

$$\frac{dw}{dt} = -\frac{3}{4} \text{ ft/sec}$$