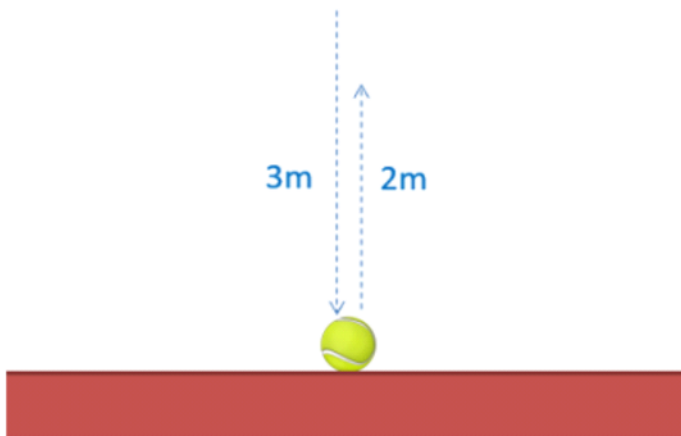


Problem 1

A tennis ball is dropped from rest from a height of 3 meters. It impacts the ground and bounces back to a maximum height of 2 meters after the impact. What is the coefficient of restitution for the tennis ball on this surface?



Initial drop

$$V_f^2 - V_o^2 = 2a \Delta y \rightarrow V_f = \sqrt{(2)(9.81)(3)} = \underline{7.67 \text{ m/s}} \text{ downwards}$$

Velocity just before impact

Bounce

$$V_f^2 - V_o^2 = 2a \Delta y \rightarrow V_o = -\sqrt{(2)(9.81)(2)} = \underline{6.26 \text{ m/s}} \text{ upwards}$$

Velocity just after impact

$$e = -\frac{V_f}{V_i} = -\frac{(-6.26)}{(7.67)} = \boxed{0.816}$$