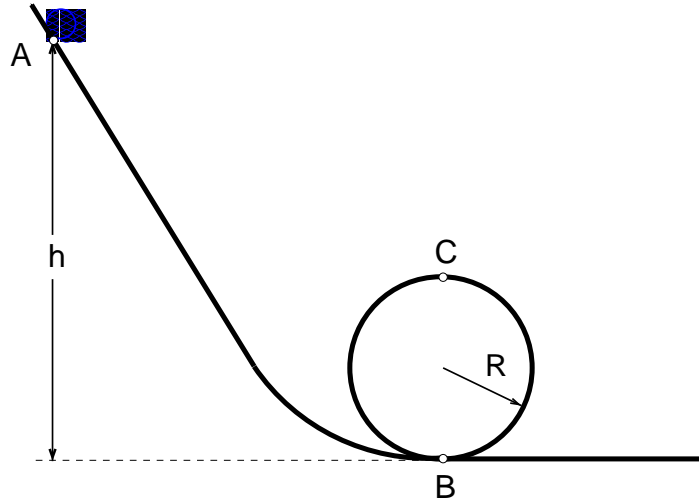


Ex : Consider rolling a ball through a loop. What is the minimum value of **h** required to make it through the loop? **Ignore friction.**



Consider conservation of mechanical energy.

$$K_A = 0 \quad U_A = mgh$$

$$K_B = \frac{1}{2}mv_B^2 \quad U_B = 0$$

$$K_C = \frac{1}{2}mv_C^2 \quad U_C = mg(2R)$$

Conservation of mechanical energy: $E_A = E_B = E_C = K + U$

$$mgh = \frac{1}{2}mv_B^2 = \frac{1}{2}mv_C^2 + 2mgR$$

Solve $E_A = E_C$ for h , $h \geq \frac{5R}{2}$