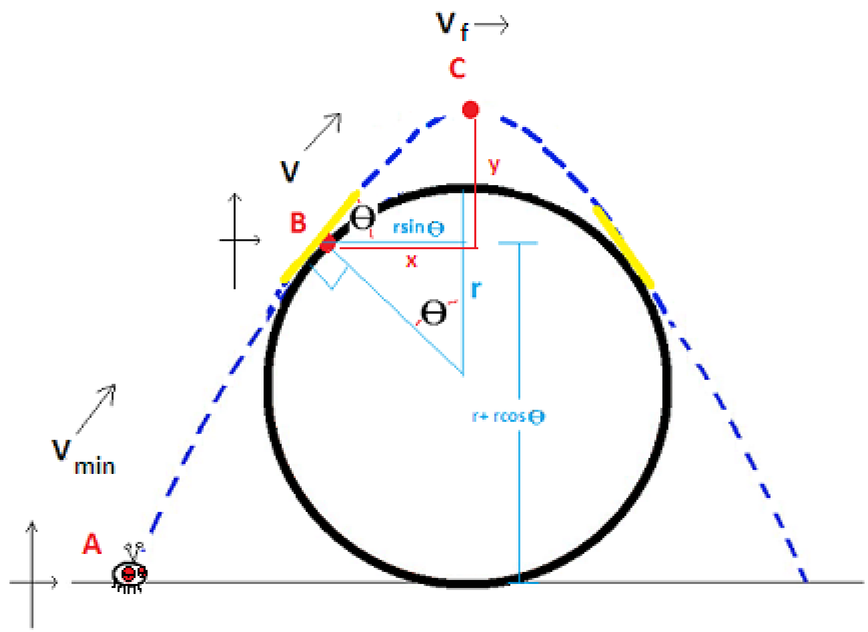
A lazy flea approaches a stationary log with radius R. At what distance from the log must the flea be to jump over the log with the least amount of effort.



A, B: $W_p + f_f S = \Delta K + \Delta U_g + \Delta U_s \rightarrow \Delta U_g = \Delta K$

$\frac{1}{2}mv_{min}^2 = \frac{1}{2}mv^2 + mg(r + rcos\theta) \rightarrow \boxed{v_{min}^2 = v^2 + gr + grcos\theta}$ Eq.(1)

B, C: $v = v_o + at$ $\quad x = x_o + v_o t + \frac{1}{2}at^2$ $\quad v^2 = v_o^2 + 2a(x - x_0)$

$x_o = 0$ $\quad y_o = 0$ $\quad$ x: $rsin\theta = 0 + vcos\theta t + 0 \rightarrow \boxed{t = \frac{rsin\theta}{vcos\theta}}$ Eq. (2)

$x = rsin\theta$ $\quad y = Y$

$v_{o_x} = vcos\theta$ $\quad v_{o_y} = vsin\theta$ $\quad$ y: $0 = vsin\theta - gt \rightarrow \boxed{v = \frac{gt}{sin\theta}}$ Eq. (3)

$v_x = vcos\theta$ $\quad v_y = 0$

$a_x = 0$ $\quad a_y = -g$ $\quad$ Eqs. (1) and (2) $\rightarrow \boxed{v^2 = \frac{gr}{cos\theta}}$ Eq. (4)

$t = T$

Eqs.(1) and (4) $\rightarrow \boxed{v_{min}^2 = \frac{gr}{cos\theta} + gr + grcos\theta}$

$2v_{min} = grsec\theta tan\theta - sin\theta$