

Name:

Solution

Quiz #6

(10 points; 6 minutes)

Full credit will be given if you get the correct answer, regardless of method.**Partial Credit may given only if you follow the methods from class.****Use at least 3 sig-figs throughout.**

14. A small block of mass $m = 3 \text{ kg}$ slides without friction along the loop-the-loop track shown. The block starts at a height $h = 60\text{m}$, and the loop has a radius $R = 22\text{m}$. What is the kinetic energy of the block when it reaches the top of the loop?

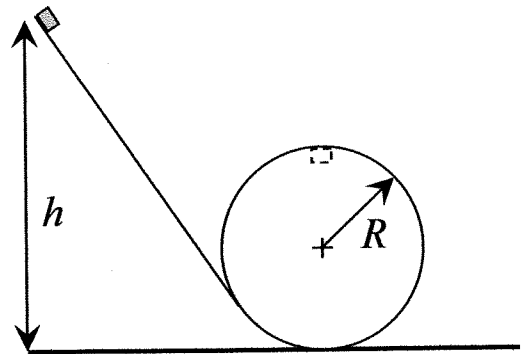
$$E_1 = E_2$$

$$mgh = mg(2R) + KE_2$$

$$KE_2 = mg(h - 2R)$$

Your answer:

$$KE = 470.4 \text{ J}$$



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11. A skier of mass $m = 65$ kg coasts up a snowy hill at an angle $\theta = 25^\circ$. The initial speed of the skier is $v_0 = 8$ m/s. After coasting a distance of $d = 3$ m up the slope, the skier's speed is only $v_f = 5$ m/s. Determine the work done by friction during this time.

$$KE_2 + PE_2 = KE_1 + \cancel{PE_1} + W_f$$

$$W_f = KE_2 - KE_1 + PE_2$$

$$W_f = \frac{1}{2}m(v_2^2 - v_1^2) + mgd\sin\theta$$

Your answer:

$$W_f = -459.9 \text{ J}$$

