Homework # 5

At time $t = 0$, a block of mass m is at the bottom left corner of the ramp shown below, traveling at speed v_0 upward and to the right. The ramp is oriented at angle θ. The bottom part of the ramp has friction with kinetic and static coefficients μ_k and μ_s. After traveling along the part of the ramp with friction for a time t_f, the block moves onto a frictionless part of the ramp. Given all the quantities listed above, at what time does the block reach its highest point?