Phys 2320 Spring 2023 Problem related to Workshop 6

Main topics: Newton's second law, vector decomposition, kinetic friction, static friction, free-body diagrams, vector addition

A 2.0 kg wood block is launched up a wooden ramp that is inclined at a 30° angle. The block's initial speed is 10 m/s. Assume no friction: what vertical height does the block reach above its starting point and what speed does it have when it slides back to its starting point? Now assume $\mu_k = 0.2$: what vertical height does the block reach above its starting point and what speed does it have when it slides back to its starting point? (Knight 4th Problem 6.51).

Answer: (without friction, 5.1 m and 10 m/s; with friction 3.8 m and 7.0 m/s)