

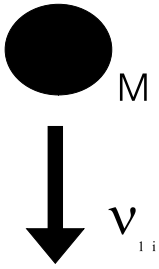
Physics 303K Worksheet 6

1. Name (Write legibly! If I can't read your name, you don't get credit for attending.):

2. Roy Munson is trying to gauge how fast he must throw his bowling ball to roll a strike. To knock over a pin, he estimates that the pin needs a velocity of 1 m/s to tip over. Each pin weighs 2 kg. It's a new frame, so there are 10 pins. The bowling ball's mass is 8 kg. What is the slowest he can throw the bowling ball and still knock over all 10 pins? Assume elastic collisions. (This is a very crude estimate: the ball is actually spinning and rolling, the collisions aren't elastic, etc.)

3. Under the pressure, you told Roy the wrong velocity. Roy didn't get a strike; he rolled a 7-10 split (where only the back two pins, farthest from one another are left standing). If he knocks over both pins on his second roll, he'll win the tournament. Otherwise, he'll have to go live with Ishmael and Blues Traveler. He rolls the bowling ball of mass M at speed v_{1i} toward one of the pins with mass m . After the collision, the bowling ball is now travelling at angle θ_1 and velocity v_{1f} . The pin is travelling at angle θ_2 and velocity v_{2f} . Find an expression for v_{1f} and v_{2f} . Does the expression make sense?

BEFORE



AFTER

