your name(s)			

Physics 321 Quiz #3 - Friday, Jan. 25

Work in groups of 3, open notes/book/internet/mouth

1. (10 pts) Two cannonballs are fired with the same muzzle velocity and initial angle (45 degrees). They feel a drag force of magnitude

$$|F_d| = \kappa
ho_{m, ext{atm}} A v^2,$$

where A is the cross-sectional area of the cannonball, $\rho_{m,\mathrm{atm}}$ is the mass density of air, v is the speed of the cannonball, and the drag coefficient κ is the same form both balls. Both balls are made of solid iron.

The first ball, a, has a radius R_a , and the second is larger with a radius $R_b = 2R_a$.

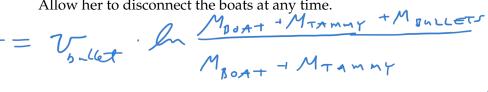
Which ball flies further?

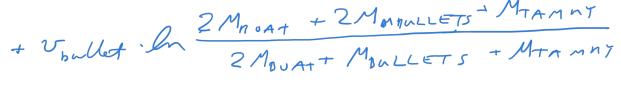






- 2. Machine gun Tammy has two ice boats which glide on a frictionless lake. The mass of each boat is $M_B = 50$ kg, and Tammy has a mass of 100 kg (including her maching gun). Each boat carries an additional mass of bullets, of 100 kg. The machine gun has a muzzle velocity of 1000 m/s.
 - (a) (10 pts) How fast can Tammy go, starting from rest, by firing the machine gun in one direction? Allow her to disconnect the boats at any time.





(b) (10 pts) How fast can Tammy go if she had 100 boats? You can write answer as a sum.

