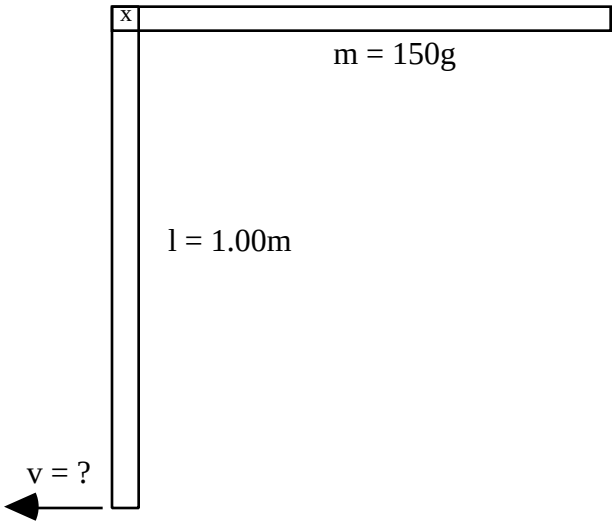
Name:_____

Physics 4A THIRD EXAM Chapters 1 - 12 Spring 1993

Solve the following problems in the space provided. Use the back of the page if needed. Each problem is worth 20 points. You must show your work in a logical fashion starting with the correctly applied physical principles which are on the last page. Your score will be maximized if your work is easy to follow because partial credit will be awarded.

1. A 1000kg car traveling eastward at 20.0m/s slams into the rear of a 4500kg truck also traveling eastward but at 8.00m/s. Assuming that they stick togther after the collision, find their resulting speed.

2. A 150g meterstick is pivoted at one end. It is initially held horizontally and released from rest. Find the speed of the tip of the meterstick when it reaches the vertical.



3. A baseball catcher sits on a rotating stool. He reaches out 85.0cm to catch a 40.0m/s fastball. After catching the ball he spins at a rate of 60rpm. His mass is 80.0kg and the mass of the ball is 150g. Find the rotational inertia of the catcher and the stool.

4. A 1.50kg - 90.0cm long baseball bat rests on the ground in such a way that only the ends are actually in contact with the ground. The center of mass is 60.0cm from the skinny end. Find the size of the forces that the ground exerts on the bat.

5. Why is it easier to keep your balance on a moving bicycle than on a bicycle at rest ? Be sure that your answer references key definitions and laws by name. Use sketches if appropriate.