Name:_____

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 student drags a 5.00kg bag of dirty laundry at a constant speed of 0.820m/s into the laundromat. The student is pulling on the bag at an angle of 53˚ above the horizontal and the coefficient of friction is 0.200. Find the force exerted by the student.

2. Tarzan has a mass of 75.0kg. He crosses a river by swinging from an 8.00m long vine. His speed at the bottom of the swing is 7.00m/s. Find the tension in the vine.

3. A 40.0kg box is at rest on a rough floor. A force of 100N is exerted on it for a distance of 4.00m. The box is now moving at 3.50m/s. Find (a)the change in kinetic energy of the box, (b)the net work done on the box, (c)the work done on the box by the 150N force, (d)the work done on the box by friction, and (e)the frictional force.

4. A child on a swing passes through the lowest point of the motion with a speed of 5.00m/s. Find the height of the child above the lowest point when the speed drops to (a)2.50m/s and (b)0m/s.

5. A 'matchbox' car must negotiate a loop-the-loop. The loop has a radius of 20.0cm. Assume no friction. Find (a)the minimum speed that the car must have at the top of the loop and (b)the minimum height above the bottom of the loop that the car must be released from to gain this speed.