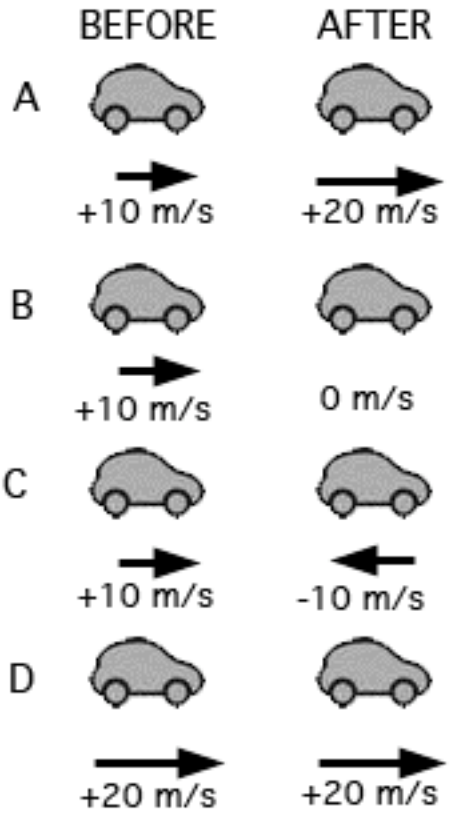
Name:_____

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. The equations you need are on the equation sheet. Your score will be maximized if your work is easy to follow because partial credit will be awarded.

1. The man at the right pushes a 15.0kg wheelbarrow at a constant speed of 0.750m/s. The normal force that the ground exerts on the wheel is 80.0N and the frictional force that the ground exerts on the wheel is 25.0N. Find the magnitude and direction of the force exerted by the man on the wheelbarrow.

2. Tarzan has a mass 0f 80.0kg and swings from the end of a 4.00m long vine. At the bottom of his swing he is moving at 6.00m/s. Find (a)the magnitude and direction of his acceleration and (b)the tension in the rope at this instant.

3. The four situations to the right show before and after "snapshots" of a car's velocity. Rank these situations, in terms of the total work done on the car required to create these changes in velocity, from most positive to most negative, All cars have the same mass. Explain your reasoning for full credit.



4. Referring back to Tarzan from problem 2, find the maximum height above the bottom of the swing that he will be able to reach.

5. The roller coaster show at the right is filled with riders and has a total mass of 2000kg. At the top of the 40.0m high hill it is moving at 6.00m/s. At the bottom it has a speed of 22.0m/s. (a)Describe at least two non-conservative forces that might be acting on the roller coaster and (b)find the total work done by all non-conservative forces.