Newton's Laws Practice Problems

Work the following problems in the space provided. Show all work including giving the information of the problem, a clear statement of the solution, a sketch of the situation, the free-body diagram, and any other diagrams and equations needed for a sufficiently complete solution that it is easily graded.

1. A 3 kg cart starting from rest on a frictionless surface is pulled by a horizontal mass-less rope with a constant force of 6 N. What is the acceleration of the cart, and how fast is it moving at the end of two seconds?

2. An elevator accelerates upward at 3 m/s^2 for a brief time. A 500 N woman standing on bathroom scales notices the reading is not what she expected. What do the scales read?

3. A 6 kg cart on a level surface is pulled at a constant velocity of 2 m/s by a constant force of 10 N. What is the acceleration? What is the friction force opposing the motion?

4. A 100 kg car pulling a 500 kg trailer accelerates at a rate of 2 m/s^2. If the frictional force on the trailer is 1000 N, with what force does the car pull the trailer? With what force does the trailer pull the car?

5. A hot air balloon (with bucket) has a mass of 900 kg. The balloon has a buoyant force upward of 12,000 N and westward wind force of 500 N. Find the acceleration of the balloon. What is the force of gravity (weight) of the balloon and bucket?