Homework Questions on Vertical Systems

1. In an effort to *rev up* his class, Mr. Standring does a demonstration with a bucket of water tied to a 1.3-meter long string. The bucket and water have a mass of 1.8 kg. Mr. Standring whirls the bucket in a vertical circle such that it has a speed of 3.9 m/s at the top of the loop and 6.4 m/s at the bottom of the loop.

a. Determine the acceleration of the bucket at each location.

b. Determine the net force experienced by the bucket at each location.

c. Draw a free body diagram for the bucket for each location and determine the tension force in the string for the two locations.

2. A 76-kg pilot at an air show performs a loop de loop with his plane. At the bottom of the 52-m radius loop, the plane is moving at 48 m/s. Determine the normal force acting upon the pilot.

3. Sheila (m=62 kg) is riding the Demon roller coaster ride. The turning radius of the top of the loop is 12 m. Sheila is upside down at the top of the loop and experiencing a normal force which is one-half of her weight. Draw a free body diagram and determine Sheila's speed.