Name:

1. Otis L. Evaderz is conducting his famous elevator experiments. Otis stands on a bathroom scale and reads the scale while ascending and descending the John Hancock building. Otis' mass is 80 kg. He notices that the scale readings depend on what the elevator is doing. Use a free-body diagram and Newton's second law of motion to solve the following problems.

a. What is the scale reading when Otis accelerates upwards at  $0.40 \text{ m/s}^2$ ?

b. What is the scale reading when Otis is traveling upward at a constant velocity of at 2.0 m/s?

c. As Otis approaches the top of the building, the elevator slows down at a rate of  $0.40 \text{ m/s}^2$ . Be cautious of the direction of the acceleration. What does the scale read?

d. Otis stops at the top floor and then accelerates downwards at a rate of 0.40  $\mbox{m/s}^2.$  What does the scale read?

e. As Otis approaches the ground floor, the elevator slows down (an upwards acceleration) at a rate of  $0.40 \text{ m/s}^2$ . Be cautious of the direction of the acceleration. What does the scale read?

f. Use the results of your calculations above to explain why Otis fells less weighty when accelerating downwards on the elevator and why he feels heavy when accelerating upwards on the elevator.