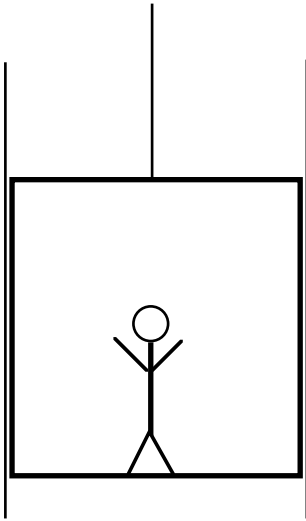


Elevator Forces

1. An elevator is moving up at a constant velocity of 2.5 m/s, as illustrated in the diagram below:
The man has a mass of 85. kg.



- a. Construct a free body diagram for the man.

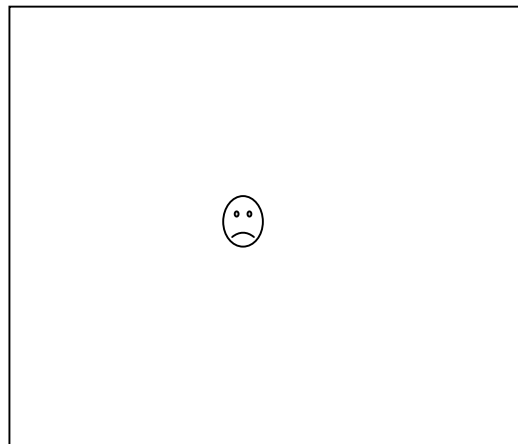
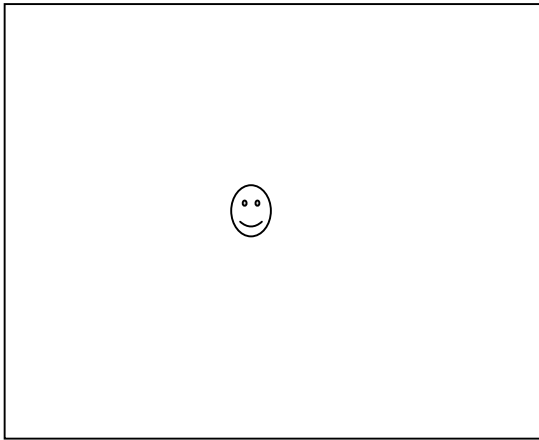


- b. What force does the floor exert on the man?
2. The elevator now accelerates upward at 2.0 m/s^2 .
- a. Construct a free body diagram for the man.
- b. What force does the floor now exert on the man?
3. Upon reaching the top of the building, the elevator accelerates downward at 3.0 m/s^2 .
- a. Construct a free body diagram for the man.
- b. What force does the floor now exert on the man?

4. While descending in the elevator, the cable suddenly breaks. Draw a free body diagram below. What is the force of the floor on the man?

5. Consider the situation where a person that has a mass of 68 kg is descending in an elevator at a constant velocity of 4.0 m/s. At some time "t", the elevator starts to slow to a stop at the rate of 2.0 m/s².

- a. Construct, **in the margin to the left**, a qualitative motion map (a set of dots with variable spacing) indicating the relative positions, velocities and accelerations of the elevator as it descends.
- b. Construct **quantitative** force diagrams (include magnitudes) for the person in the elevator as it descends at (a) constant speed and (b) during its period of acceleration.



- c. If the person in the elevator were standing on a bathroom scale calibrated in newtons, what would the scale read while the elevator was (a) descending at constant speed and (b) while slowing to a stop? Please explain your answers.