

**Quiz #2: Motion in One Dimension**

**Problem 1** (1 point)

A stone is thrown vertically upwards, reaches a highest point, and returns to the ground. When the stone is at the **top** of its path, its acceleration

- a) is zero.
- b) is directed upwards.
- c) is directed downwards.
- d) changes direction from upwards to downwards.

**Problem 2** (1 point)

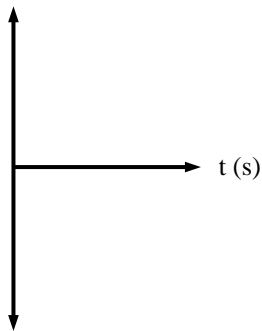
Which one of the following situations is *not* possible?

- a) A body has zero velocity and non-zero acceleration.
- b) A body travels with a northward velocity and a northward acceleration.
- c) A body travels with a northward velocity and a southward acceleration.
- d) A body travels with a constant velocity and a time-varying acceleration.
- e) A body travels with a constant acceleration and a time-varying velocity.

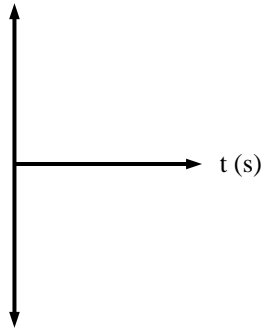
**Problem 3** (3 points)

A ball is thrown vertically upward, rises to its maximum height, and returns to the thrower's hand. Sketch three different graphs showing the position, velocity, and acceleration of the ball as a function of time. Take upward to be the positive direction and the release point of the ball to be the zero position.

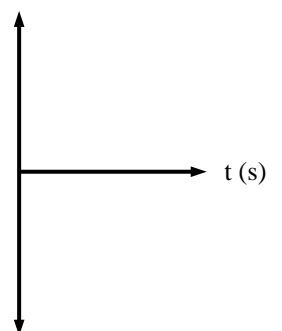
position (m)



velocity (m/s)



acceleration (m/s<sup>2</sup>)



**Problem 4** (5 points)

SuperJoe, using his incredible Physics knowledge, starts from rest and accelerates at a spectacular rate of  $13.5 \text{ m/s}^2$  for a distance of 325 m. He then uses his awesome powers to slow down at the rate of  $-8.50 \text{ m/s}^2$ . How long was SuperJoe in motion, from start to stop?