1-D Motion Review

1. What are the MKS units for position, velocity, acceleration, and time?

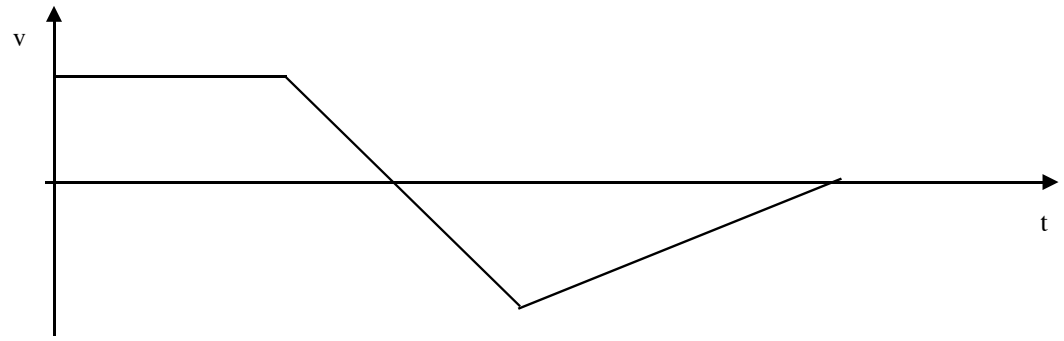
2. Draw the two different horizontal motion diagrams that represent speeding up. Identify the direction for the velocity and acceleration for each case.

3. A car uniformly speeds up from 20.0 m/s to 25.0 m/s over 150.0 m.
   a. What was the acceleration?
   b. Sketch the motion diagram for the car's motion.

4. While driving along the highway at 30.0 m/s a driver is forced to slam on her brakes and come to a stop in 4.00 seconds.
   a. How far does the car travel while coming to rest?
   b. Sketch the three motion graphs for the motion of the car.

5. A cart rolls up a ramp, across level ground, and down a ramp. On the way up, it slows down from 3.0 m/s to 0.5 m/s in 4 s, maintains that speed along the level section for 10 seconds and then speeds up to 2.5 m/s on the 4.0 meter final ramp. Draw the 3 motion graphs for this motion. Include values of positions, velocities, accelerations and times.

6. a. Draw the x vs t and a vs t graphs for the following v vs t graph.
   b. Describe the motion for the set of graphs.



7. A drip of water takes 0.75 seconds to fall to the ground.
a. How high above the ground is the source of the drop?
b. What is the final velocity of the drop?
c. Explain how your answer to b tells you direction.

8. A ball is thrown directly up in the air with an initial speed of 15 m/s.
a. How long will it take for the ball to reach its maximum height?
b. What is the maximum height of the ball?
c. What is the total time that the ball is in the air?
d. What is the velocity of the ball when it gets back to the launch position?

9. A boat can travel 6.0 m/s in still water. It is going to travel 200.0 meters upstream, then back to the original position on a river that has a current of 1.5 m/s.
a. How long will it take the boat to travel upstream?
b. How long will it take the boat to travel back downstream?
c. How does the total time of the round trip compare to the same boat on still water?