

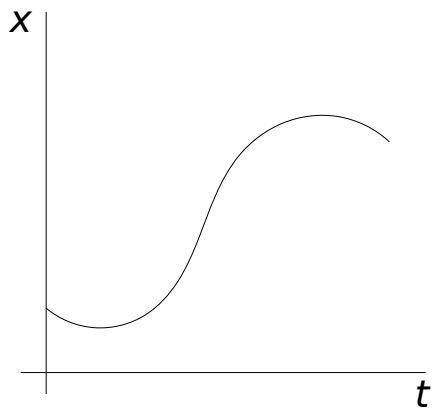
Names: \_\_\_\_\_

# PHYS 211: Problem Set 1

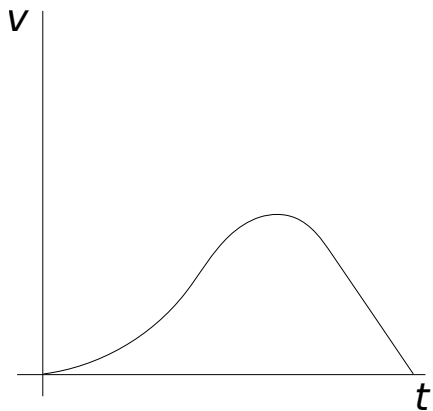
May 15, 2012

1. In the following assume that the initial speed and position are 0 where not mentioned or shown.

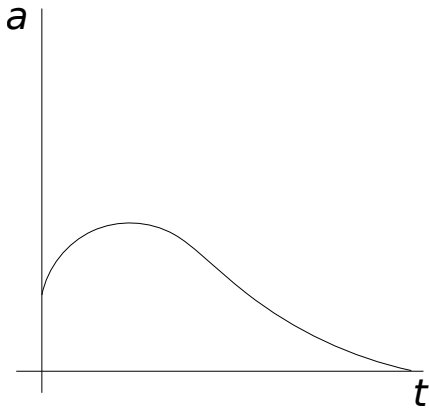
- Draw the  $v$  vs.  $t$  and  $a$  vs.  $t$  plots corresponding to this  $x$  vs.  $t$  plot:



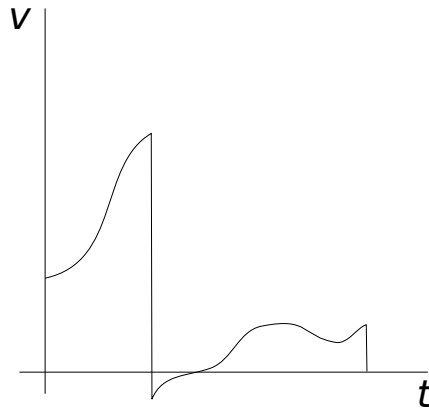
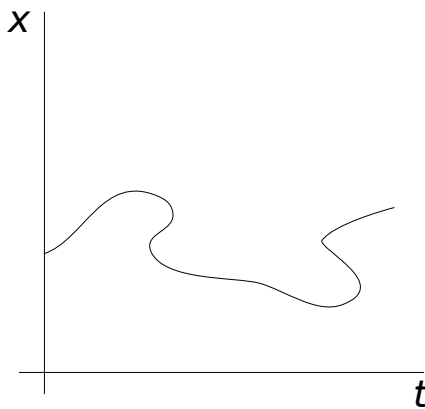
- Draw the  $x$  vs.  $t$  and  $a$  vs.  $t$  plots corresponding to this  $v$  vs.  $t$  plot:



- Draw the  $x$  vs.  $t$  and  $v$  vs.  $t$  plots corresponding to this  $a$  vs.  $t$  plot:



2. Find what's wrong with the following two plots:



3. You're really late for an awesome concert, and you need to get there asap! There's two routes you can choose from. One's 25 miles long, has a speed limit of 25mph and has 6 stop signs. The other route is on a freeway with a 50mph speed limit, but it's 50 miles long. Which route would you prefer and why? Convince the other people in your group of your stand.
4. In the above problem, can you estimate how long each route will take to get to your destination? Draw  $x$  vs  $t$  and  $v$  vs  $t$ , and  $a$  vs  $t$  plots and see if they make sense, or give the same results. Assume that you don't do anything illegal :).
5. Alright, here's a classic one with a tiny twist. Two trains start out at their respective stations at the same time 80 miles apart. The start moving towards each other - one(A) at 40mph and the other(B) at 50mph (ignore the time required to get up to speed). About 10minutes into the journey, B develops a snag and the engine cuts out, and it begins to coast with a constant deceleration of 5 mph/min. In other words, it loses 5 mph of speed every minute. That all would be good, except there's a severely ill passenger on train B, and there's no help that can reach them, except train A. The person had about 40 minutes to live since B left the station - will train A make it on time? (BTW: It'll help if you broke this problem down into tiny bits, drew pictures, etc. - understand the situation and all that's happening before you embark on any calculations.