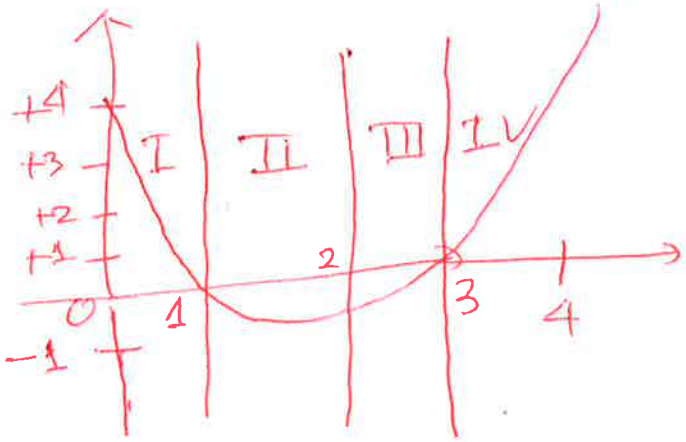
Homework #1

Solve all problems.

01/19/2016

Pblm #1

Motion in 1-Dimension



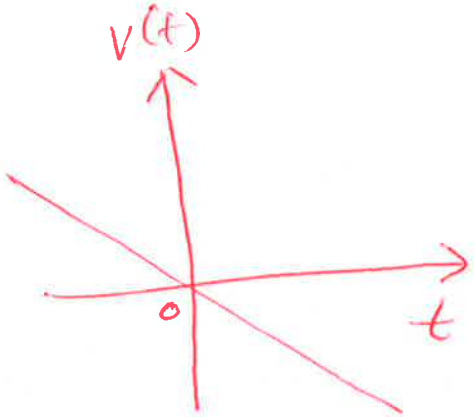
Find out which regions have velocity > 0. Show your work?

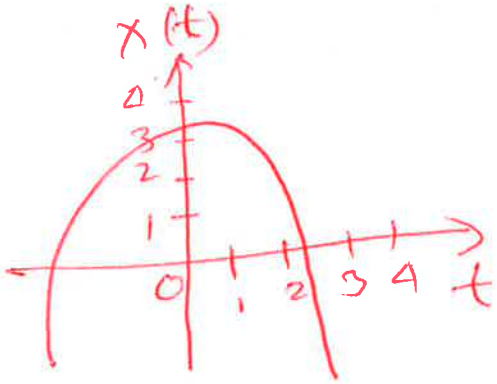
Pblm #2

Given velocity vs time graph on right side

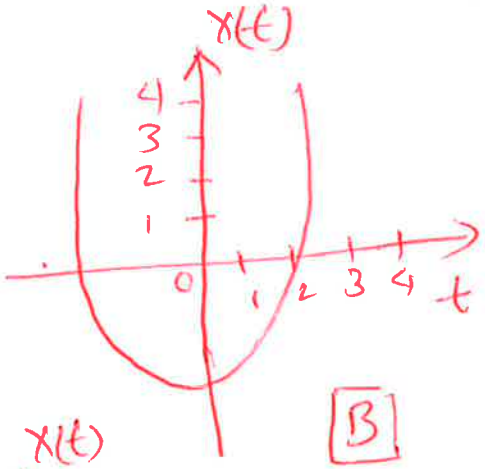
Identify the correct graph for displacement vs time ?

(x vs t)

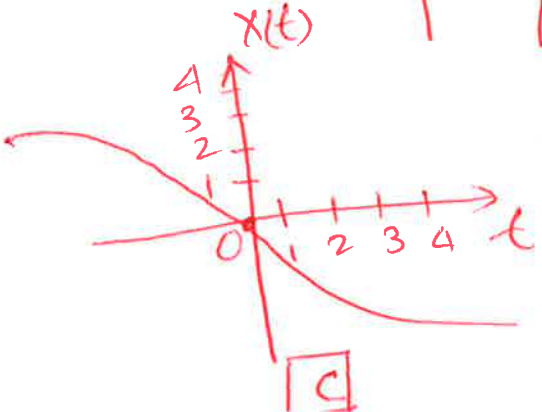




A



B

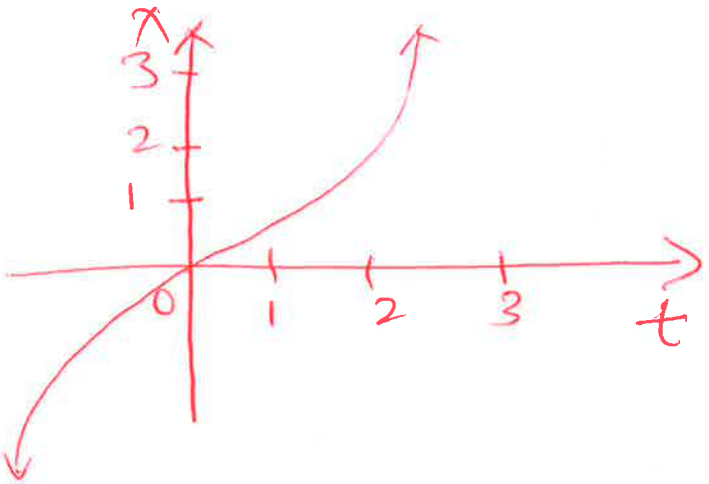


C

Show your work in detail?

Pblm #3

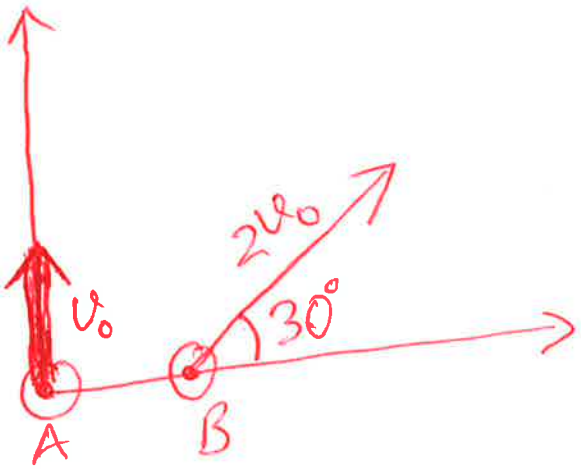
Given displacement vs time graph:



Find the appropriate plot for acceleration vs time?

Pblm #4

Two balls are thrown from the same level as shown. Ball 'A' is thrown with velocity (V_0) in the vertical direction. Ball 'B' is thrown with velocity ($2V_0$) at an angle of 30° with repect to horizontal. which ball will go higher?

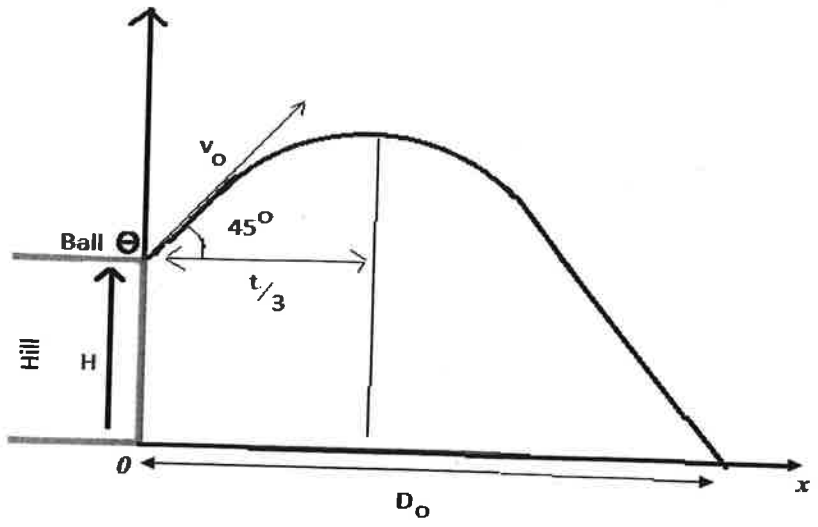


01/28/16

Pblm #B

~~Question #1~~: 2D kinematics: *Projectile motion*: **[10]**

A boy shoots a football from the top of a hill with velocity (v_0). The ball flies off the hill and lands onto a plain surface at a distance (D_0) from the base of the hill as shown below. The height of the hill from its base is (H). Air friction is neglected.



(a) The ball flies off the hill at an angle of 45° and keeps moving up in the air against the gravity for one-third of the total time of flight (t) before it begins to drop. What was the total time of flight of the ball (t) just before it hits the ground?

[2]

(b) Determine the initial velocity (v_0) of the ball soon after it leaves the hill-top. [i.e. find an expression for the velocity in terms of H, D_0 and g.]

[2]

(c) What are the components of the final velocity of the ball before it hits the ground? Determine the speed of the ball when it hits the ground if $H=D_o/2$? [4]

(d) What was the direction of the ball's velocity just before it hits the ground? [2]