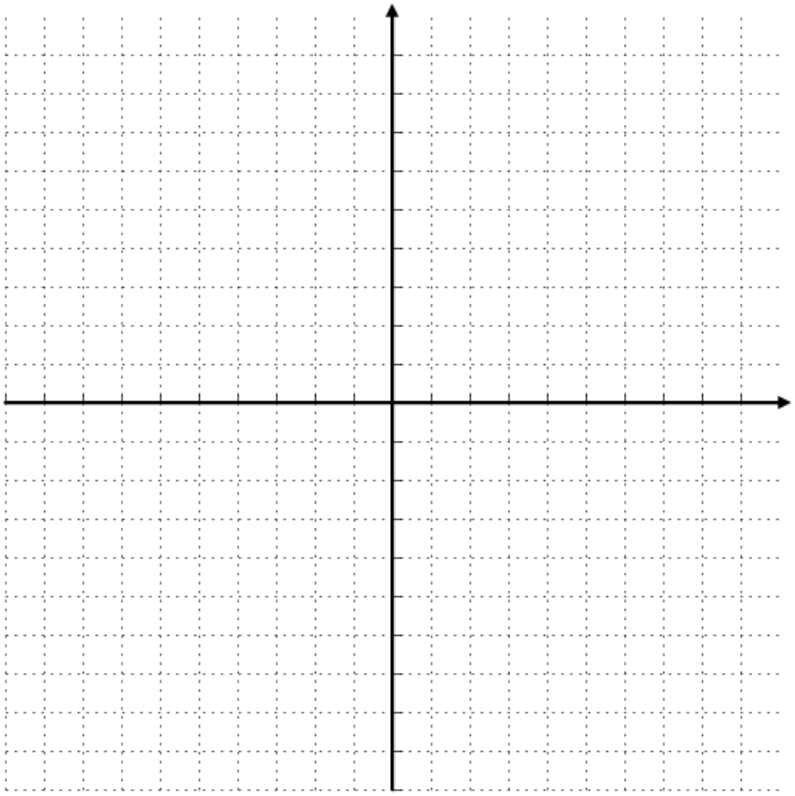
Name: _____

Date: _____

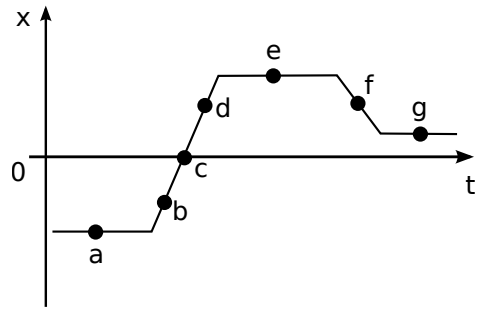
Cornell University
Prison Education Program

Conceptual Physics
Class 4 Questions
Feb. 23, 2018

1. Plot the following (t, x) ordered pairs on the graph below. Make sure you label your axes.
   $(1, 5)$ $(-2, -4)$ $(-3, 1)$ $(6, -2)$ $(3, 2.5)$



2. Consider the following **position** versus time graph for some object.



(a) At which point(s) is the object not moving?

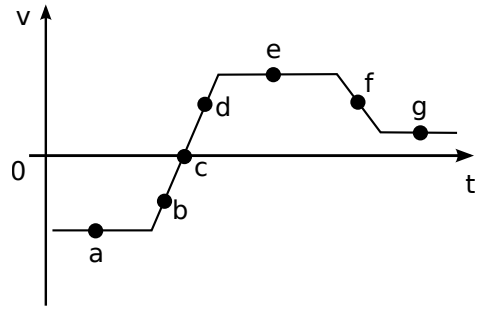
(b) At which point(s) is the object moving at a constant velocity?

(c) At which point(s) is the object moving with a positive velocity?

(d) At which point(s) is the object moving with a negative velocity?

(e) At which point(s) does the object experience zero acceleration?

3. Now, let consider the following **velocity** versus time graph for some object.



(a) At which point(s) is the object not moving?

(b) At which point(s) is the object moving at a constant velocity?

(c) At which point(s) is the object moving with a positive velocity?

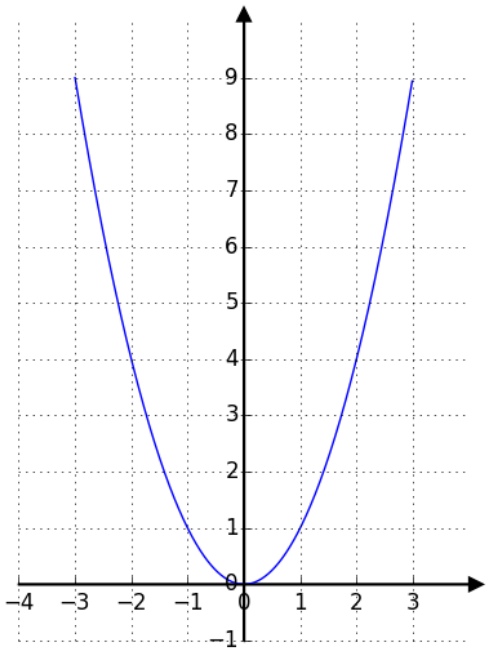
(d) At which point(s) is the object moving with a negative velocity?

(e) At which point(s) does the object experience zero acceleration?

(f) At which point(s) does the object experience positive acceleration?

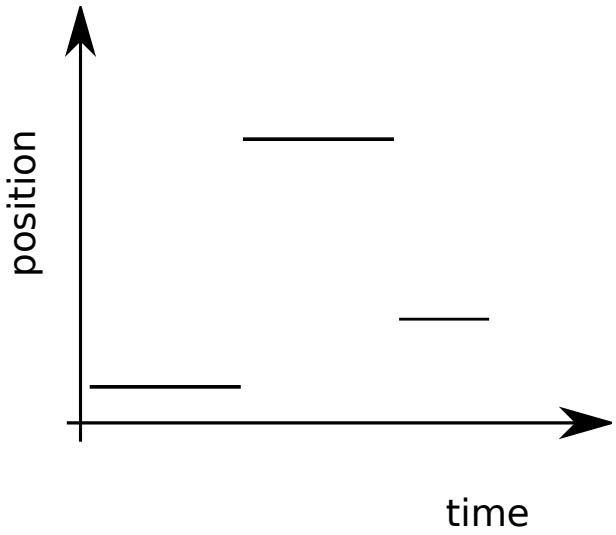
(g) At which point(s) does the object negative acceleration?

4. What is wrong with this plot?

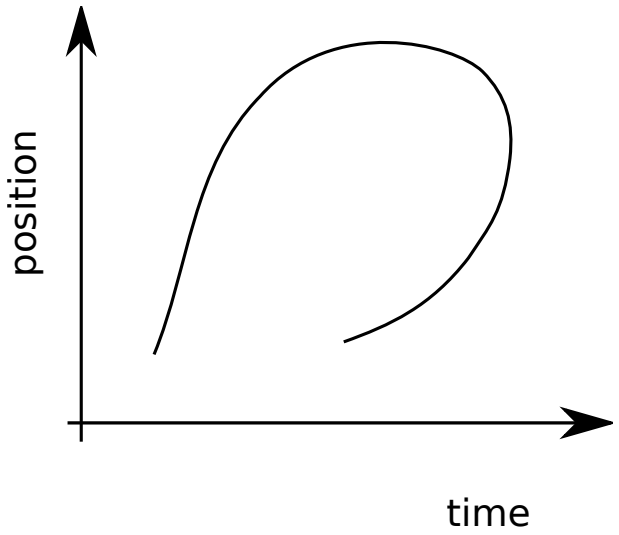


5. Consider the following two graphs of position versus time for some object. What is strange about each of them? (From *Light and Matter*, Chapter 2, discussion question E)

(a)



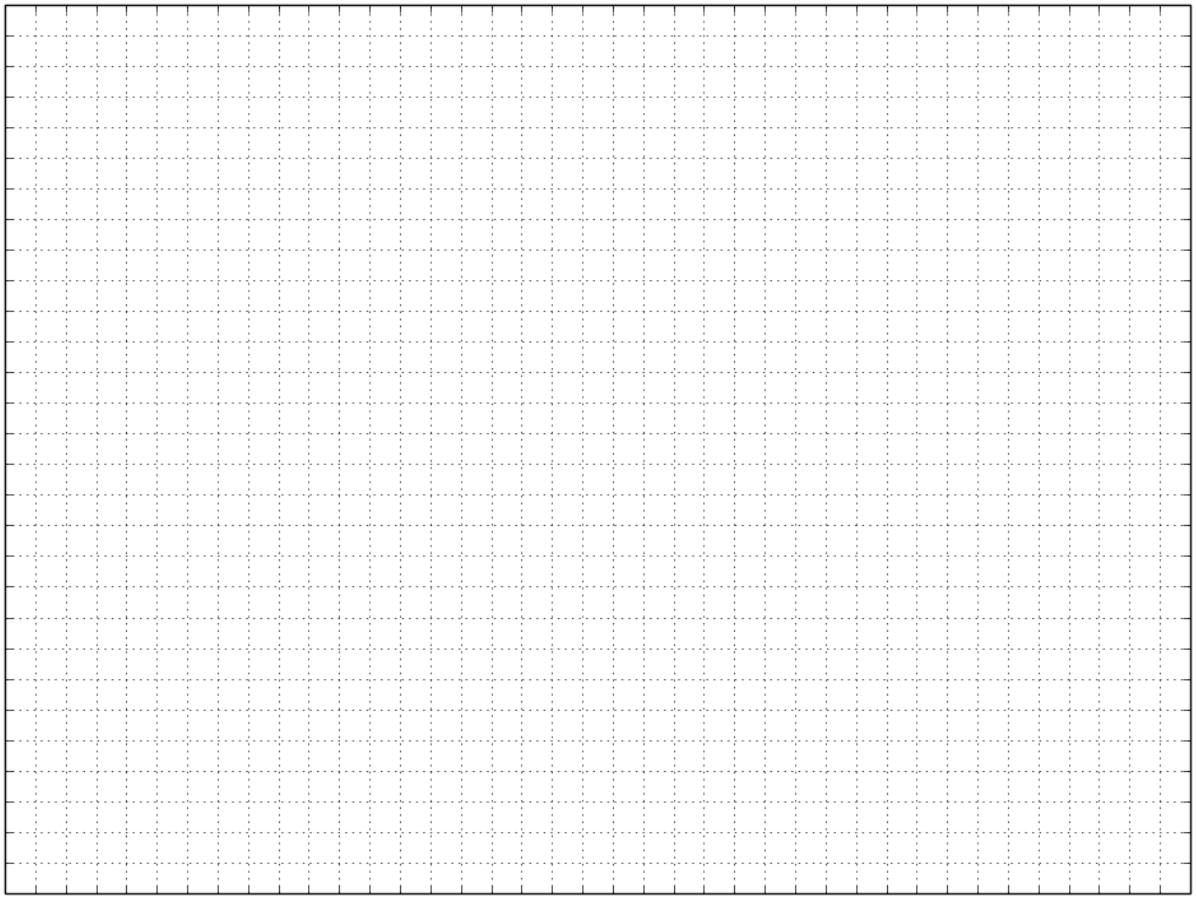
(b)



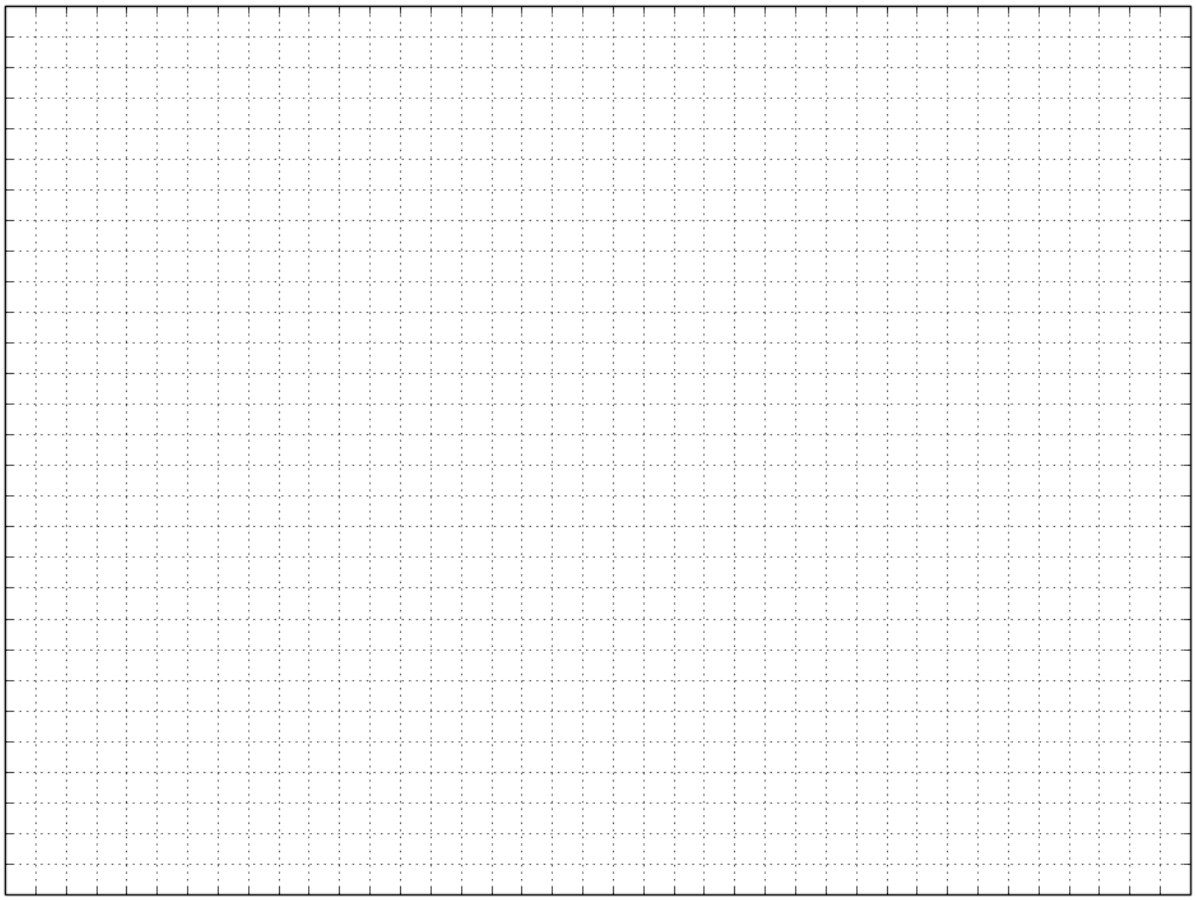
6. The Shinkansen is a network of high-speed railway lines in Japan. The trains reach a maximum operating speed of 320 km/h (200 mph), although in April 2015 one set the world record 603 km/h (375 mph).

   One of these high-speed trains accelerates (assume constant acceleration) from rest at a station, reaching its maximum operating speed (3.20×10^2 km/h) in 1.00 minutes. It continues to cruise at this speed for 10.0 minutes, then slows down to a stop during the course of one more minute to reach the next station (assume constant deceleration). After waiting 5 minutes for passengers to embark/disembark, it returns to its original stop by performing the same course in reverse: accelerating to 3.20×10^2 km/h in 1.00 minutes, cruising for 10.0 minutes and slowing down to a stop in another minute.

   (a) Using the grid below, plot the train's **velocity** as a function of **time**.



(b) Using the grid below, plot the train's **acceleration** as a function of **time**.



(c) Using the grid below, plot the train's **position** as a function of **time**.