DeAnza College

Kinematics
Motion in 1-Dimension
Graphs and Problem Solving

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Last time

- graphing kinematic quantities against time

Overview

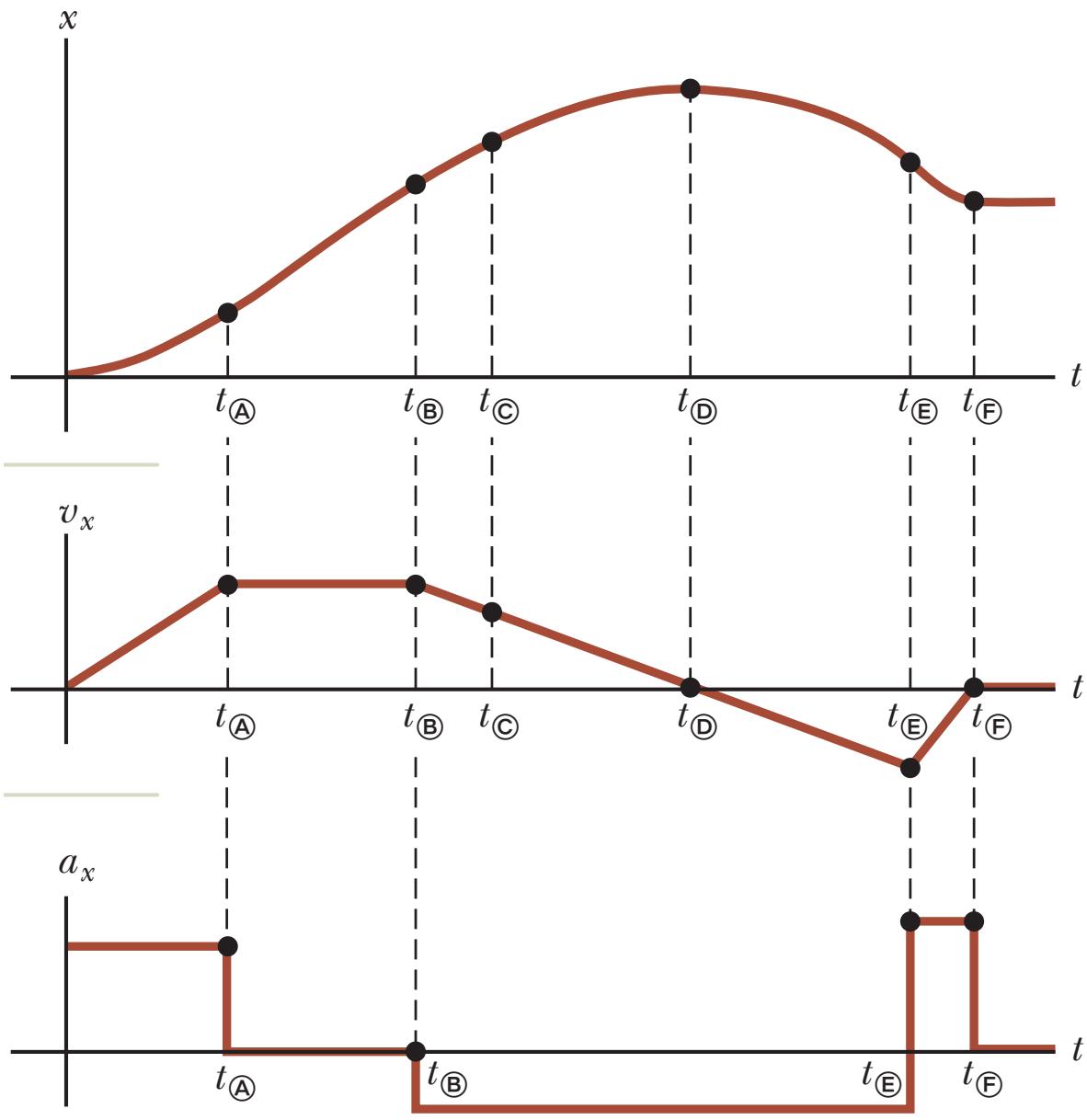
- more about graphs of kinematic quantities vs time
- how to solve problems

Reminder: Graphing Kinematic Quantities

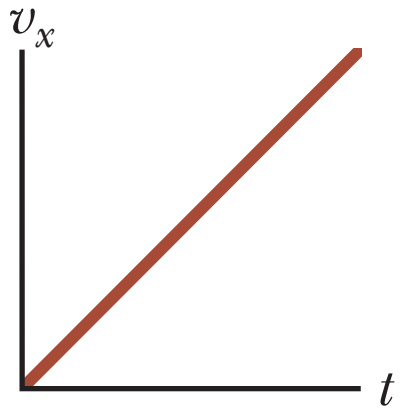
One very convenient way of representing motion is with graphs that show the variation of these kinematic quantities with time.

Time is written along the horizontal axis – we are representing time passing with a direction in space (the horizontal direction).

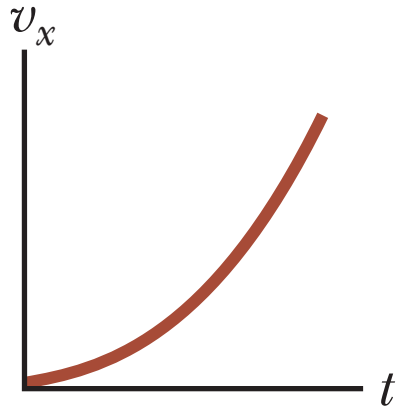
Relating Graphs



Matching Velocity to Acceleration Graphs



a



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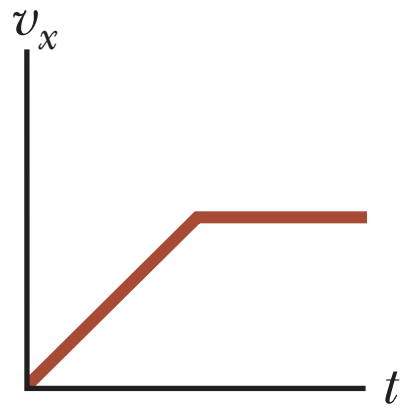

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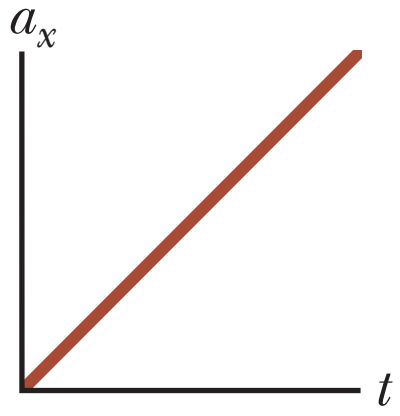

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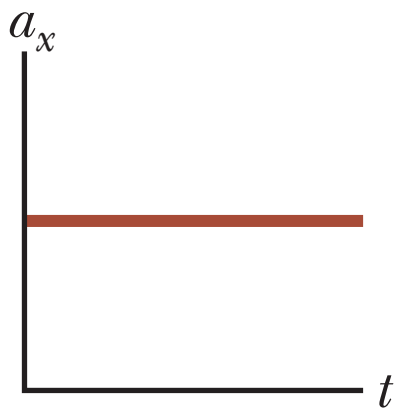

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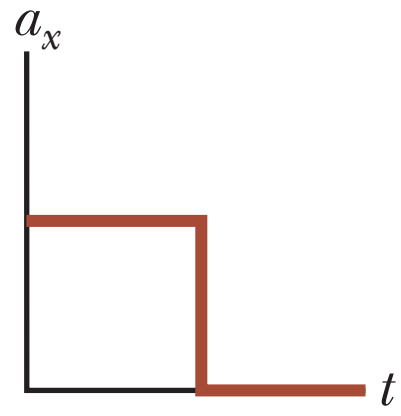
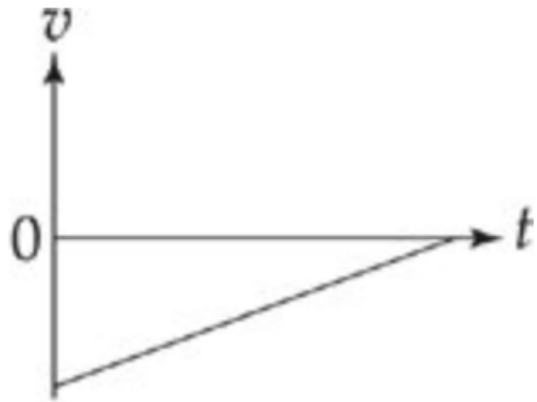


f

More Graph Matching Questions

Which of the following position-time graphs corresponds to this velocity-time graph?



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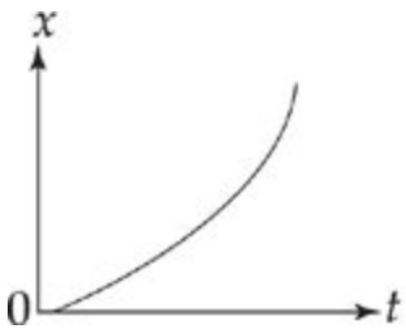
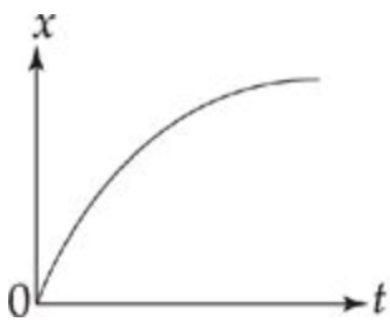
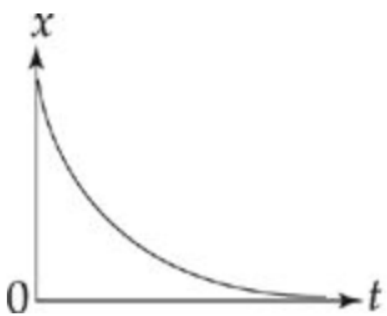


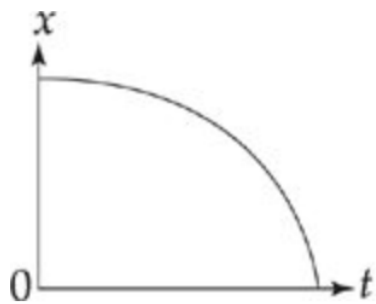
B



C



D



[1]Figures from Leduc, "Cracking the AP Physics B Exam" Princeton Review.

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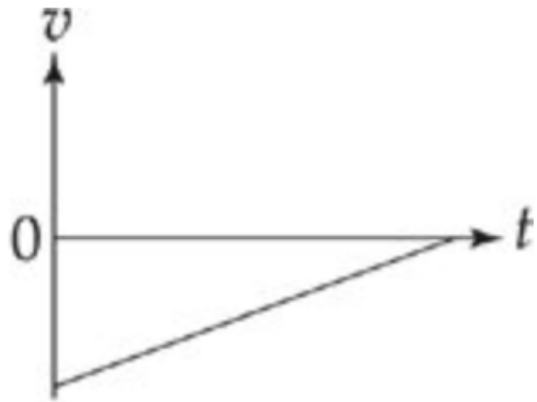

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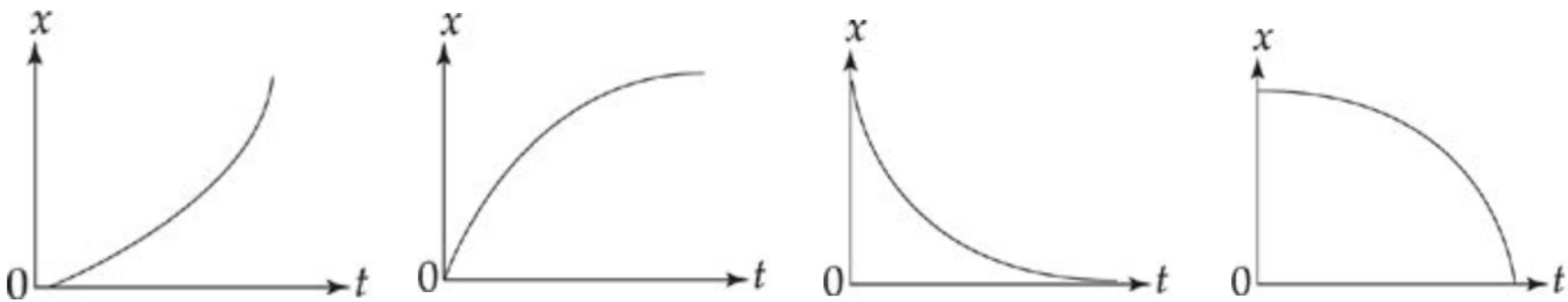

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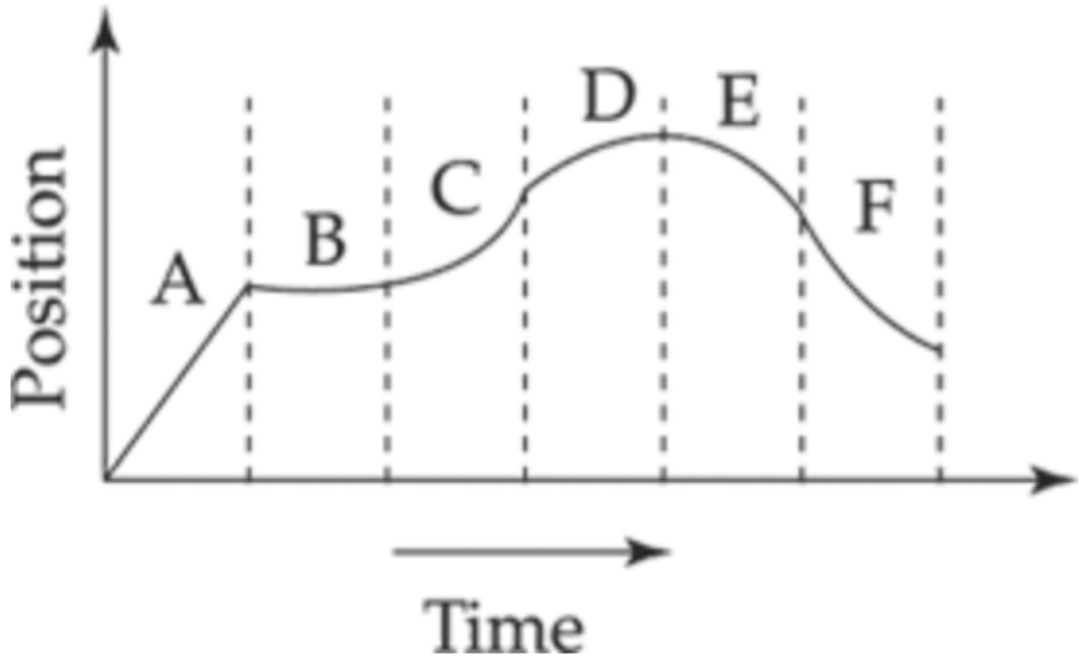
More Graph Matching Questions

Sketch the velocity-time graph that corresponds to this position-time graph:



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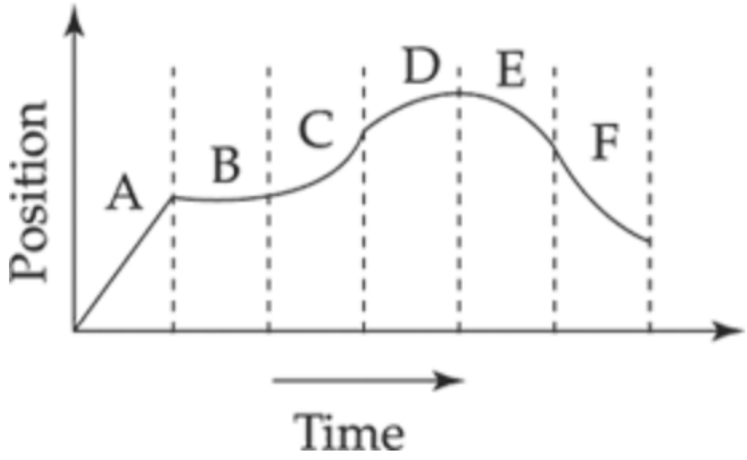

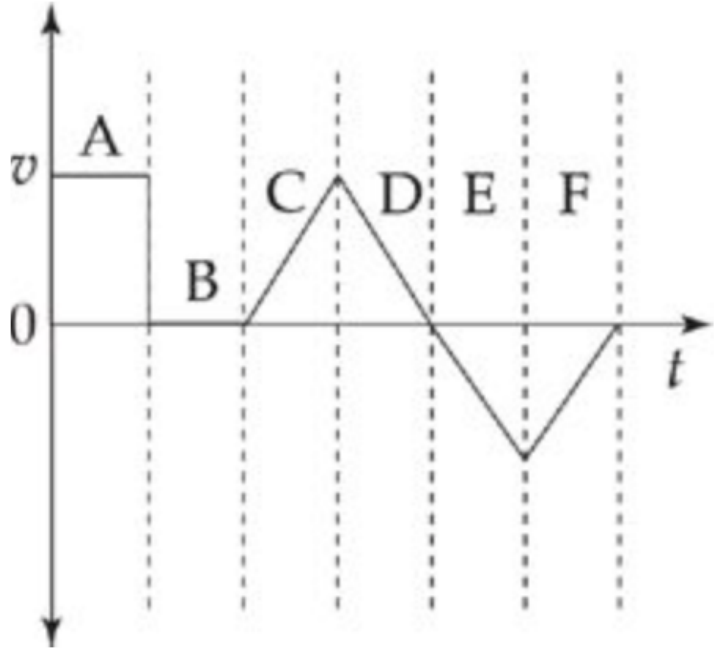

How to solve problems

Solving physics problems is often not simple.

To get into good habits for future work in physics, we will follow a set process.

This process is similar to the process that physicists and engineers go through solving problems, sometimes only mentally, sometimes explicitly.

(Also have a look at the similar process and examples on page 12 of the textbook.)

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      i. Write out quantities given in question and quantity asked for.
      ii. Write out the equation(s) you will use. (Start from equations we have discussed in class.)
      iii. Do any required algebra.
      iv. Plug in givens and solve.
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      iii. Do any required algebra.
      iv. Plug in givens and solve.
      v. Check units.
4. Analyze answer as appropriate.
   a. Compare answer to hypothesis - if it is not the same try to explain why.
   b. Is your answer reasonable? / Compare to other things your are familiar with.
   c. Consider limits or special cases.

Summary

- graphing kinematic quantities

Quiz Tues, start of class.

Homework

- graphs multiple choice worksheet, *do on 882-E scantron sheet*, due Wednesday, Jan 22.

Walker Physics:

- Ch 2, onward from page 47. Probs: 26*, 37

*Ans for 26: (a) which has the steepest slope?, (b) 1 m/s, (c) 2 m/s, (d) 0.5 m/s