Announcements 6 Feb 09

- **Homework**
  - **Homework #2 due on Friday by 8 am (to be posted this weekend)**
  - **Mixture of conceptual problems, tutoring problems, "standard" end-of-chapter problems**
- **Learning Resource Center: help sessions**
  - **SI leader: Nikki Woodward**
  - **Two 75-min sessions per week to be held at DuBois library:**
    room ???
    room ???
    (starting next week)

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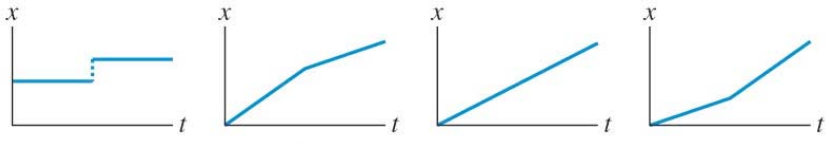
Position-vs-time graph question

PRS

Here is a motion diagram of a car moving along a straight stretch of road:

Which of the following position-versus-time graphs matches this motion diagram?



A. **B.** **C.** **D.**

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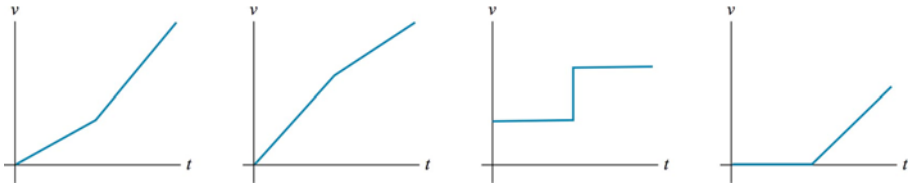
Velocity-vs-time graph question

PRS

Here is a motion diagram of a car moving along a straight stretch of road:

Which of the following velocity-versus-time graphs matches this motion diagram?



A. **B.** **C.** **D.**

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Problem 2.11

In an 8.00 km race, one runner runs at a steady 12.0 km/h and another runs at 14.9 km/h. How far from the finish line is the slower runner when the faster runner finishes the race?

How do we approach this sort of problem?

Find the equation then plug-and-play?

First figure out what kind of motion this is
What changes? What remains the same?

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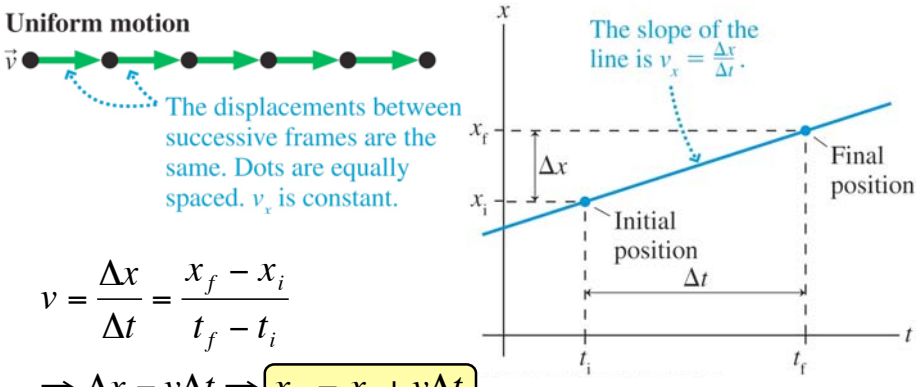
Uniform Motion

Straight-line motion with equal displacements during any successive equal-time intervals
➔ motion with constant velocity



$$v = \frac{\Delta x}{\Delta t} = \frac{x_f - x_i}{t_f - t_i}$$

$$\Rightarrow \Delta x = v\Delta t \Rightarrow \boxed{x_f = x_i + v\Delta t}$$

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Solving Problems in 3 steps: Prepare, Solve & Assess

MP Problem-Solving Strategy

PREPARE The "Prepare" step of a solution is where you identify important elements of the problem and collect information you will need to solve it. It's tempting to jump right to the "solve" step, but a skilled problem solver will spend the most time on this step, the preparation. Preparation includes:

- **Drawing a picture.** In many cases, this is the most important part of a problem. The picture lets you model the problem and identify the important elements. As you add information to your picture, the outline of the solution will take shape. We will give tips for drawing effective pictures for different problems. For the problems in this chapter, a picture could be a motion diagram or a graph—or perhaps both. Later in the chapter you will learn a strategy for drawing a complete *visual overview* of a problem that incorporates these and other elements.
- **Collecting necessary information.** The problem's statement may give you some values of variables. Other important information may be implied, or must be looked up in a table. Gather everything you need to solve the problem, and include it as part of your picture or an accompanying table.
- **Doing preliminary calculations.** In some cases, there are a few calculations, such as unit conversions, that are best done in advance of the main part of the solution.

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SOLVE The "Solve" step of a solution is where you actually do the mathematics or reasoning necessary to arrive at the answer needed. This is the part of the problem-solving strategy that you likely think of when you think of "solving problems." But don't make the mistake of starting here! If you just choose an equation and plug in numbers, you will likely go wrong and will waste time trying to figure out why. The "Prepare" step will help you be certain you understand the problem before you start putting numbers in equations.

ASSESS The "Assess" step of your solution is very important. When you have an answer, you should check to see if it makes sense. Ask yourself:

- **Does my solution answer the question that was asked?** Make sure you have addressed all parts of the question and clearly written down your solutions.
- **Does my answer have the correct units and number of significant figures?**
- **Does the value I computed make physical sense?** In this book all calculations use physically reasonable numbers. You will not be given a problem to solve in which the final velocity of a bicycle is 100 miles per hour! If your final answer seems unreasonable, you should go back and check your work.
- **Can I estimate what the answer should be to check my solution?**
- **Does my final solution make sense in the context of the material I am learning?**

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Problem 2.11

In an 8.00 km race, one runner runs at a steady 12.0 km/h and another runs at 14.9 km/h. How far from the finish line is the slower runner when the faster runner finishes the race?

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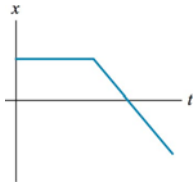
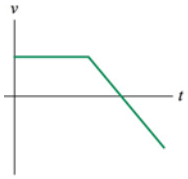
Position-vs-time graph question

PRS

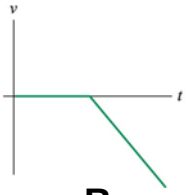
A graph of position versus time for a basketball player moving down the court appears like so:



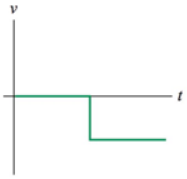
Which of the following velocity graphs matches the above position graph?



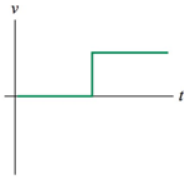
A.



B.



C.



D.

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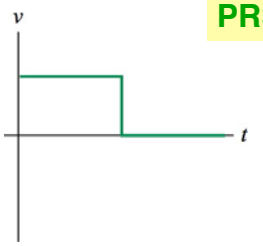
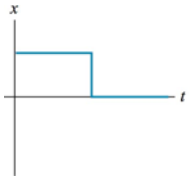
Velocity-vs-time graph question

PRS

A graph of velocity versus time for a hockey puck shot into a goal appears like so:



Which of the following position graphs matches the above velocity graph?



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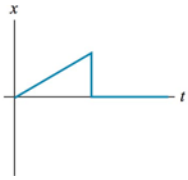
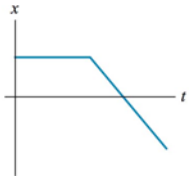


B.



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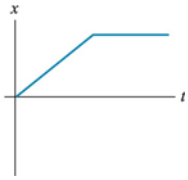

D.

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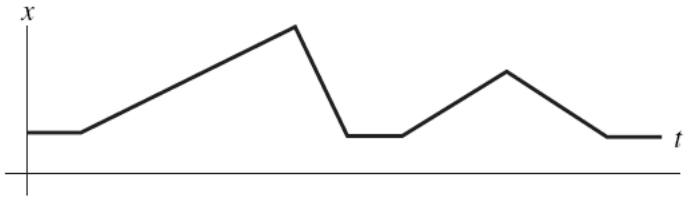
Position-vs-time DEMO



Can you move according to this graph?

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Problem Solving Example

A soccer player is 15 m from her opponent's goal. She kicks the ball hard; after 0.50 s, it flies past a defender who stands 5 m away, and continues toward the goal. How much time does the goalie have to move into position to block the kick from the moment the ball leaves the kicker's foot?

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Problem Solving Example

Cleveland and Chicago are 340 miles apart by train. Train A leaves Cleveland going west to Chicago at 1:00 PM, traveling at 60 mph. Train B leaves Chicago going east to Cleveland at 2:00 PM, going 45 mph. At what time do the two trains meet? How far are they from Chicago at this time?

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