Math 111 Supplement 1-3 HW Comments/Hints

It may take some time to get used to the type of homework in this course. The hints below should help you get going on the more difficult problems this week. I typically won't post as many hints after the first week, but I wanted to help give you a little boost this first week. Here are a couple general strategies to always try:

1. **UNDERSTAND THE GRAPH:** Make a small table and get a few points from the graph. This will help you understand what the graph is telling you. A very common mistake is to misread the given graph.
2. **UNDERSTAND THE QUESTION:** Carefully read the question. Label every 'noun' related to the course with the corresponding variable. Make sure you know what you are being asked to find.
3. **USE FORMULAS AND DEFINITIONS:** Once you understand the graph and the question, then you should think about all the formulas, definitions and relationships that you know from lecture and the text. That is, you should look up everything you know about the terms (for example, if the question asks about Average Trip Speed, then you can write down ATS = (total dist)/(total time) = 'the slope of a secant line through the graph at t=0 and the current point')

Here are some examples from homework:

Supplement 1-3

PROBLEM 3(d): "Use the graphical interpretation of average speed to compute the average speed during the 2.5-minute interval ending at t=10."

Here's how to approach this problem:

1. UNDERSTAND THE GRAPH: The given graph is Distance vs. time. So speeds are going to be slopes of secant lines on this graph.
2. UNDERSTAND THE QUESTION: The interval given is 7.5 to 10 minutes. You are asked to find the average speed over this time interval.
3. USE FORMULAS AND DEFINITIONS: From class, we know that average speed is the slope of the secant line from 7.5 to 10. So draw the secant line that goes through the graph at 7.5 and 10. Find two ease to read points on that line. And compute the slope.

PROBLEM 2(d): "How far does the car travel in the first 40 minutes?"

Here's how to approach this problem:

1. UNDERSTAND THE GRAPH: The given graph is **Average Trip Speed** vs. time (when you graph of a rate like this, then put your ruler away!). Points on the graph are average trip speeds.
2. UNDERSTAND THE QUESTION: You need to find the total distance traveled in the first 40 minutes.
3. USE FORMULAS AND DEFINITIONS: Recall that $ATS = \frac{\text{Total Distance}}{\text{Total Time}}$. You want to find total distance. You are given that the total time is 40 minutes and you can get the ATS from the graph. At $t = 40$, the ATS is about 1.41 mpm (I read this value from the graph). So we can solve for Total Distance. Substituting into the formula $ATS = \frac{\text{Total Distance}}{\text{Total Time}}$ gives $1.41 = \frac{\text{Total Distance}}{40}$. Muliplying both sides by 40 gives Total Distance = 56.4 miles.

PROBLEM 4(d): "Find a five-minute interval in the first thirty minutes during which Car A travels 4 mile."

Here's how to approach this problem:

1. UNDERSTAND THE GRAPH: The given graph is Distance vs. time. So speeds will be slopes of secants.
2. UNDERSTAND THE QUESTION: You need to find a 5-minute interval. During that 5-minute interval the distance needs to increase by 4.
3. USE FORMULAS AND DEFINITIONS: There are a couple of ways you could approach this problem.
   (a) Method 1: Sequentially guess and check. You could just start trying 5 minutes early and try to eyeball an answer. The interval 0-5 min doesn't work because the distance increases by about 5 miles. The interval from 5-10 min doesn't work because the distance increases by about 8 miles. The interval from 10-15 min doesn't work becasue the distance increases by about 12 miles. And so on...
   When you find a five minute interval where the distance increases by about 4 miles, then you can adjust slightly around that interval to get a more precise answer.
   (b) Method 2: Draw a line that represents this information as a slope. The information given says when the graph goes over 5, then it goes up 4. Draw a 'reference' line with that slope (over 5, up 4) that goes through the origin. Then use your ruler to look for a five minute interval on the graph when the secand would be parallel to this line.

   Both methods are essentially guess and check, but perhaps you can see that the second makes it quicker.