Assignments Mtht 400: Methods of Teaching Secondary Mathematics I

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Fall 2004

AT denotes the book Algebraic Thinking, published by NCTM which is our main text for the semester.

Aug. 30:
1. Chapter 3 from The Teaching Gap will be discussed on Aug. 30

2. Turn in Aug. 30: A bottle of wine contains 1 liter of wine. Next to it is a glass which holds .4 liter of water. One teaspoon (2 ml) of water is taken from the glass and mixed into the wine. Then a teaspoon of the mixture is stirred back into the glass.

   Is there more water in the wine or more wine in the water?

   Write out both 'intuitive' and 'algebraic' solutions of this problem. Think about the use of variables in each solution.

3. Two articles expand on the first class; I don't intend to schedule further discussion but they are interesting.

   (a) The article 'From Words to Algebra, mending misconceptions' by Lochhead and Mestre, page 321 of AT

   (b) Some Misconceptions Concerning the Concept of Variable, Rosnik, page 313 of AT.

Sept 13:
1. Why Algebra can should and must be in 8th grade, Zalman Usiskin, page 40 Algebraic Thinking

2. In each of the following label your variables very carefully and write the solution in a form you would like to read on a blackboard. Write a few sentences of English explanation about how you set the problem up.

   (a) It takes a bicyclist 4 minutes to ride a mile a against the wind and 3 minutes with the wind. How long would it take her to ride a mile with no wind. (Hint: not 3.5 minutes).

(b) Joe walks from Jackson south to Taylor on Halsted. At the same time, Hank walks from Taylor north to Jackson on the same sidewalk. Each maintains a steady pace. Joe arrives at Taylor 5 minutes before Hank arrives at Jackson and 4 minutes after the two pass.

  i. What is the ratio of their speeds?
  ii. Would it be possible to actually find the speed of Joe or Hank?
  iii. Do you know how the length of the trip: in minutes, in feet?
  iv. If you get any extraneous solutions to equations in the middle of your solution explain how you decide which one to take and why the extraneous solutions arose.
  v. (extra credit extension:) Graph these two equations in three variables; Maple would be useful.

Sept 27: Constructing Meaning for the Concept of Equation, Herscovics and Kiernan, page 181 of AT.

- Algebraic Thinking: A Theme for Professional Development, by Ruopp, Cuoco, Rasala and Kelelmanik page 374 of AT.

Nov 22: An agenda for research on the learning and teaching of Algebra, Wagner and Kiernan page 362 of AT.