

Northeast Consortium on Quantitative Literacy
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**Refocused College Algebra –
A Basis for Quantitative Literacy**

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The two principal thrusts of quantitative literacy, in my opinion, are:

- Problem-solving in the modeling sense
- Developing students to be exploratory learners

These are also the principal goals of refocused college algebra.

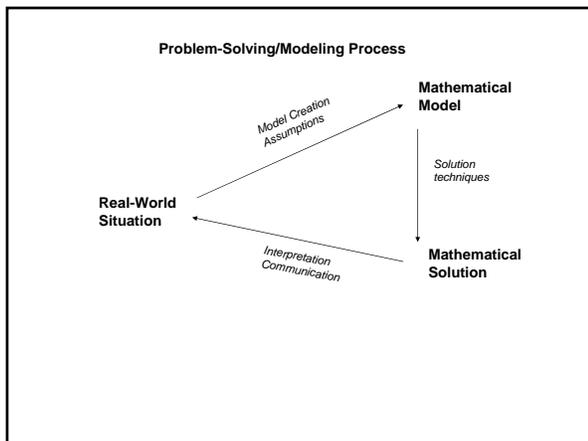
“Data from the U.S.Department of Health and Human Services indicates that the cumulative number N of reported cases of AIDS in the United States in year x can be approximated by the equation ,

$$N = 3,362.1x^2 - 17,270.3x + 24,032$$

where $x = 0$ corresponds to 1980. In what year did the total reach 550,000?”

A “refocused” version of this exercise would have the students:

- a. Develop a model (give or direct the students to the data, have them form a scatter plot of the data, and then fit a curve to the scatter plot).
- b. Answer the question: In what year did the total reach 550,000?
- c. Interpret the model and the answer to the question. (E.g., is the answer reasonable? Why? Is the model reasonable? Why? Does the model show any intervention effects? For what span of years is the model reasonable? Explain.)



A refocused college algebra course emphasizes creative problem solving – leveraging the power of human reasoning to formulate and validate, while using the power of technology to calculate.

This is central to quantitative literacy.

Problem-solving paradigm:

- Sketch and label a picture where appropriate
- Define variables
- List or display the pertinent information
- List assumptions
- Clearly state what the problem is asking.

Exploratory Learning

How do we teach students to

- Learn from a text?
- Question?
- Penetrate below the surface level when reading?
- Identify critical ideas?
- Challenge conclusions?
- Identify underlying assumptions?
- Identify domains of applicability?

I propose we make a sustained effort to

- Shift the responsibility for student learning from the instructor to the student.
- Assign new material to be studied and problems over it before the material is discussed in class.
- Have students brief the new material in the class after it is assigned.
- Have students brief and then what-if the homework problems in class.

- Assign questions that ask students to what-if certain worked examples in their reading.
- Include small group discovery type activities within the normal class framework.
- Incorporate into class work queries from the news, grocery store, financial markets, etc.
- Requiring students to explain under what conditions do their results make sense.

Conclusion

The two principal goals of refocused college algebra:

- Develop students' abilities for problem-solving in the modeling sense
- Develop students to be exploratory learners

form the foundations for quantitative literacy.

Why is the cross section of the tank on an oil truck elliptical rather than circular as it is on a milk truck?