What does it take to transition underprepared students to Algebra?

Karen D. King

December 2, 2010

CADRE PI Meeting

Rhetoric around Algebra as a course

- The sooner a student takes algebra the "smarter" the child is
  - Push for all students to take Algebra in the 8th grade
  - In higher income communities, the appearance of parents "bragging" about how early their students take Algebra
- On the other hand, there is a concern about how to "get students through Algebra"

My Personal Experience

- In the 1990s, EQUITY 2000, a program of The College Board, lead to a requirement in Prince George's County that all students must take Algebra to graduate from high school
- I worked with the program to design alternatives for students underprepared for this new requirement
  - Saturday Academy
  - Double-period algebra
  - Semesterized block schedules to allow for repeats

Assumptions Then

- These measures were transitional, until students in lower grades who were prepared for the new requirements arrived in the middle grades and high school
- The requirement of Algebra for All would lead to the reduction/elimination of students underprepared for Algebra, and thus at risk for not completing high school

So, what happened?

- Algebra for All became the norm for high school graduation across the nation
- Large numbers of students still underprepared for Algebra by the 9th grade
- 15 years later, we still do not know what to do with these students

Common Strategies Currently Employed

- Extend the time students who are underprepared spend in mathematics class
  - Extra time during the school day
    - Double period algebra
    - Extra math period for remediation
  - Extra time outside the traditional school hours
    - Charter schools with Saturday hours or longer school days

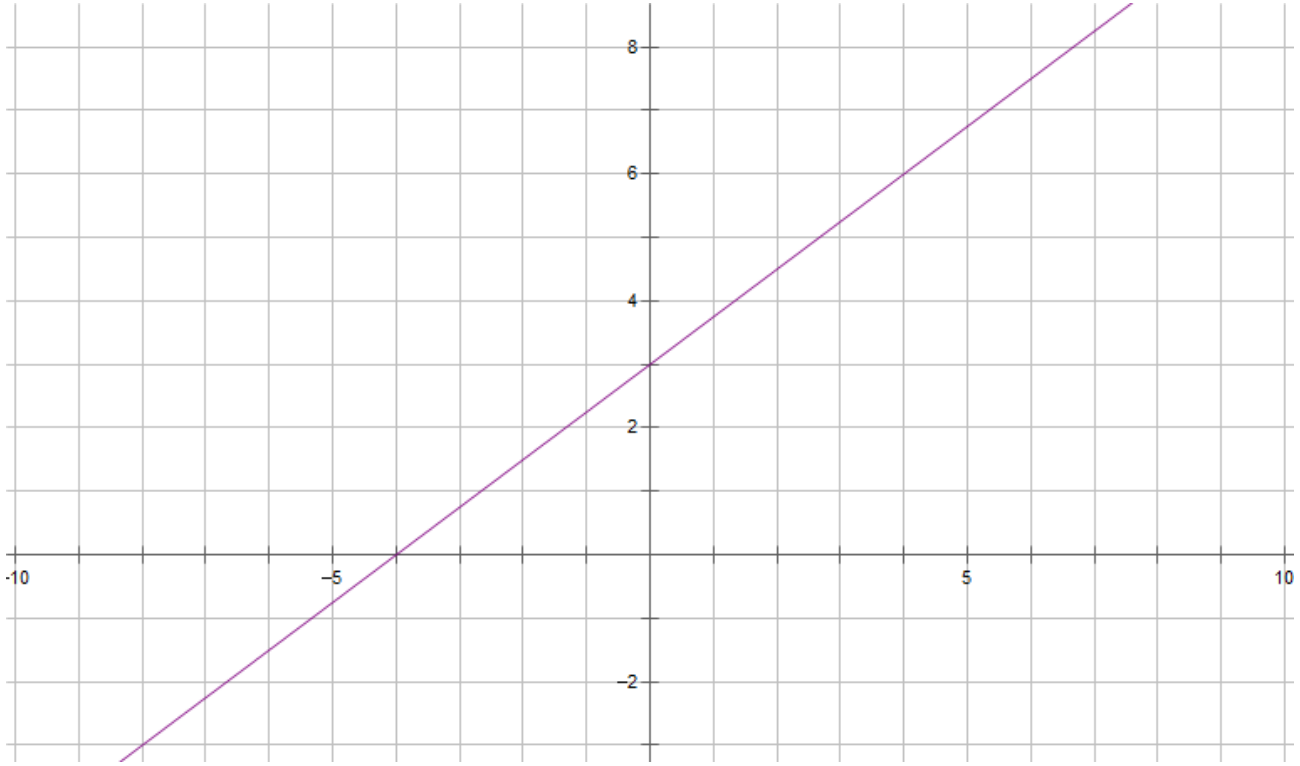
Assumptions underlying the current solutions

- There are specific mathematical deficiencies that students have that need to be remediated.
- The additional time is needed to remedy these deficiencies

Accepting these assumptions, how do we organize and use this extra time effectively?

- Given the complexity of algebraic reasoning, do all students need help in the same thing?

Given the graph below, find the equation for this line.



Addressing these difficulties

- How do we diagnose these difficulties and provide just-in-time support for students' learning?
- Is just-in-time support sufficient, or are these ideas really **pre-requisite**?
- What is really **pre-requisite** and what is **co-requisite** for algebraic learning?

Given these issues

- How can we provide these supports for students in typical classrooms with typical teachers?
  - Prior to algebra, what can we provide for teachers to support students in learning those things that are truly prerequisite in typical classrooms?
  - During algebra, how do we create realistic just-in-time diagnostics and interventions that can be addressed in a regular classroom?

Alternative Assumptions/Ways of Framing the Problem or Solutions

- Learning algebra is hard and the need for more time is not for remediation but to help students work through the difficult aspects (Dan, Al)
- We don't know what algebra really is and therefore what students should be prepared for (Mary Ann)
- Students are not motivated to learn algebra, so students and teachers do not use the time they have for learning algebra efficiently (Chris)