

ASSESSMENT STRATEGIES FOR AN INVERTED MATHEMATICS CLASSROOM

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WHAT IS AN INVERTED CLASSROOM, AND WHY WOULD YOU WANT TO?

- In-class focus on challenging concepts and problems
- Out-of-class practice of procedural skills
- Challenge students while they have access to the support of classmates and instructors
- Students should be engaged with math in the classroom




WHAT IS AN INVERTED CLASSROOM, AND WHY WOULD YOU WANT TO?

- A greater conceptual mastery of concepts leads to greater procedural mastery
- In-class assessment allows students to demonstrate understanding and see their own learning progress.
- Students' success in class shifts their self-concept as math learners.



QUESTIONS THAT INFORMED OUR WORK

- What are the characteristics of a powerful classroom?
 - What activities in a mathematics classroom lead to effective learning of mathematics?
 - What are the actual struggles of students who place into pre-college math classes?
 - What experiences might shift students' mindsets about themselves as math learners?
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ASKING FOR STUDENT BUY-IN AND CLASSROOM NORMS

Not Helpful	Instead
Only one way to do this problem	<ul style="list-style-type: none">• We have time to think about a problem to figure out our own approach.• We are curious to see multiple approaches to a problem.
Being scolded for having the wrong answer	<ul style="list-style-type: none">• We accept mistakes as a chance to grow and learn.• My instructor and classmates treat me with respect.
Lecture, Lecture... On and On	<ul style="list-style-type: none">• In class there is a high level of interaction between teachers and students.• Students engage in hands-on learning in class.

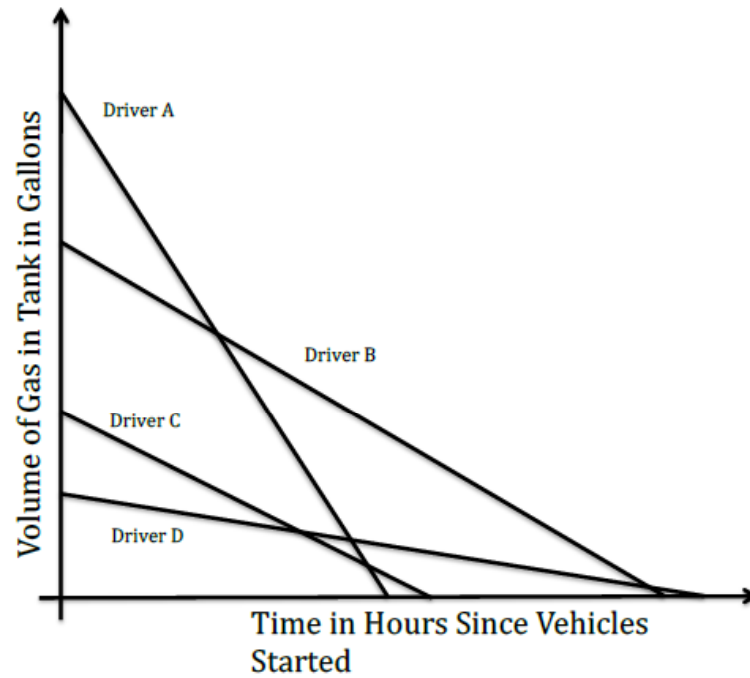
HOW DO WE CREATE TASKS THAT ALLOW FOR PRODUCTIVE STRUGGLE IN-CLASS?

- Mastery Tasks
- Open ended questions: What can you tell from the graph?
- Gasoline problem
 - How much scaffolding do we want in our activity? What are the benefits and drawbacks of scaffolding the activity?



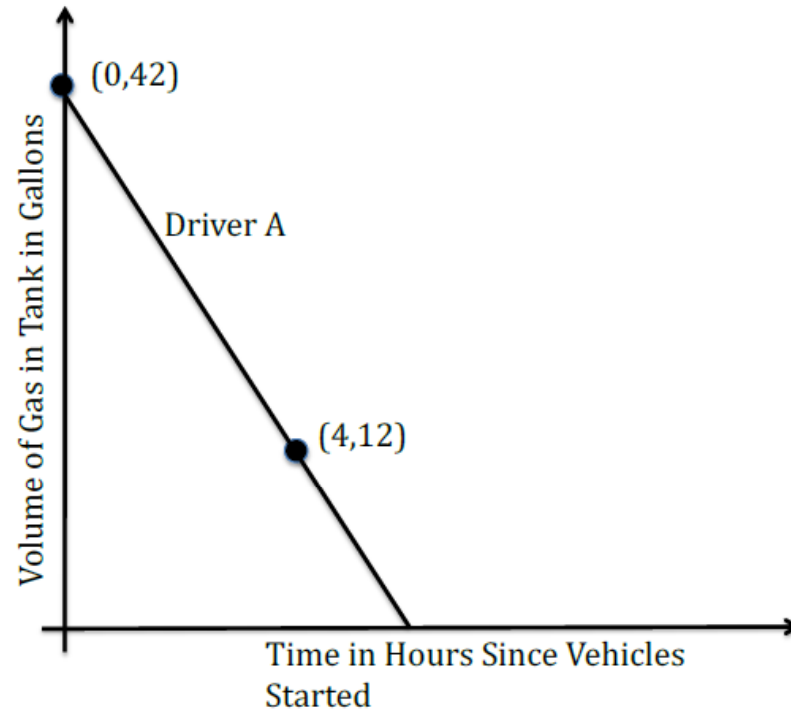
Assumptions: Four cars start driving with full tanks of gas on a flat road at a constant rate of 60 miles per hours. All the cars continue until they run out of gas.

What Can you Determine from this Graph?



Now You Have More Information About One of the Cars.

What can you determine given this Data?



HOW DO WE CREATE TASKS THAT MAKE STUDENT MISCONCEPTIONS VISIBLE?

- Ask students to justify whether two slopes are equivalent.
- Consider the examples of student work. What can we determine about the students' understanding from their responses?
- How do students convince themselves that they are right?



HOW DO WE CREATE TASKS THAT ENCOURAGE STUDENTS TO MAKE EXPLICIT CONNECTIONS?

- Ask students to connect and compare multiple representations of the same line.
- Matching cards with the different representations
- Given 1 representation, complete the others.



HOW DO WE ASSESS STUDENT LEARNING IN THIS NEW STRUCTURE?

- Who benefits from the formative assessments?
- Can we aid students in developing self-assessment skills for their
 - Accuracy and efficiency
 - Conjectures
 - Conclusions
 - Extension questions



HOW DO WE RESPOND TO THE RESULTS OF OUR ASSESSMENTS?

- Responding to students
- Reflecting on our own practice

