Official SAT Practice

Lesson Plans
for Teachers by Teachers

LESSON 3 (3 OF 5 FOR HEART OF ALGEBRA)

Systems of Linear Equations and Inequalities in Context

Subscore: Heart of Algebra

Focus: Using algebra to analyze and solve problems in context, otherwise known as word problems. These contextual problems require the use of more than one variable and equation or inequality in order to solve

Objectives:

Students will

- define more than one variable and create more than one equation to represent a context and answer questions.
- create and solve systems of equations and systems of inequalities.

Before the Lesson:

- ☐ Review the Teacher Notes.
- ☐ Make sure there is a way for students to access Examples 1 and 2.
- ☐ Make sure students have a way to access Official SAT® Practice during class.

Introductory Activity | **15 minutes**

- Have students complete these example problems on their own, and then turn and talk to a partner about their solution and process for solving.
  - Circulate around the room as students discuss their process and solutions. Ask these types of questions:
    - What equations did you set up?
    - How did you solve the system of equations?
    - How did you decide what method to use when solving the system?
    - For Example 2, how can you use the answer choices to help you?

Example 1

Maizah bought a pair of pants and a briefcase at a department store. The sum of the prices of the pants and the briefcase before sales tax was $130.00. There was no sales tax on the pants and a 9% sales tax on the briefcase. The total Maizah paid, including the sales tax, was $136.75. What was the price, in dollars, of the pants?

Example 2

Each morning, John jogs at 6 miles per hour and rides a bike at 12 miles per hour. His goal is to jog and ride his bike a total of at least 9 miles in no more than 1 hour. If John jogs j miles and rides his bike b miles, which of the following systems of inequalities represents John's goal?

- **A.** $j/6 + b/12 < 1; j + b \geq 9$
- **B.** $j/6 + b/12 \geq 1; j + b \leq 9$
- **C.** $6j + 12b \geq 9; j + b \leq 1$
- **D.** $6j + 12b \leq 1; j + b \geq 9$

Teacher Notes

- See pages 202–203 (Examples 6 and 7) in Chapter 16 of the *SAT Study Guide for Students* for solutions and explanations.
- If students are struggling to set up equations, remind them that the underlying principles for solving are the same as in previous contexts: defining variables, creating equations to represent relationships, solving equations, and interpreting the solution.
- Review the methods for solving systems of equations: combination or substitution. Discuss how students can make strategic decisions about which method might be more efficient for a given set of equations.

Group work | 25 minutes

- Within Khan Academy® Official SAT Practice, have students complete the Basic and Harder Examples for "Systems of linear equations word problems" and "Systems of linear inequalities word problems."
  - Make sure that students stop the video when they can see the problem.
- Have students talk through each problem with a partner before watching the videos.
  - Did they use the same approach and method for solving?
  - Have students identify areas they are struggling with.

Wrap-Up: For your term book or word wall | 5 minutes

- System of equations/inequalities
- Methods for solving systems: combination or substitution

Homework | 20 minutes

- For students who have linked accounts and begun personalized practice, complete practice problems in Official SAT Practice on Khan Academy in these skill areas:
  - Systems of linear inequalities word problems
  - Systems of linear equations word problems
- For students who have not yet linked accounts or imported scores, take Diagnostic Quiz 3