

Lesson 25: Two-Variable Linear Equations

LESSON 25: Two-Variable Linear Equations part 2

Weekly Focus: two-variable equations
Weekly Skill: application

Lesson Summary: For the warm-up, students will solve a problem about plumbing repair cost. In Activity 1, they will practice problems in the student book. In Activity 2, they will work on word problems in the workbook. Activity 3 is an application activity with systems of equations. There is an extra word problem at the end. Estimated time for the lesson is 2 hours.

Materials Needed for Lesson 25:

- *Mathematical Reasoning Test Preparation for the 2014 GED Test Student Book (pages 62 – 63)*
- *Mathematical Reasoning Test Preparation for the 2014 GED Test Workbook (pages 82 – 85)*
- Application activity: <https://www.yummymath.com/wp-content/uploads/sports-systems.pdf>

Objectives: Students will be able to:

- Solve the review word problem and write equations
- Solve problems with systems of equations with the substitution and elimination methods
- Solve the problems in the application activity about going to a sports game

ACES Skills Addressed: N, CT, LS

CCRS Mathematical Practices Addressed: Building Solution Pathways, Mathematical Fluency

Levels of Knowing Math Addressed: Intuitive, Abstract, and Application

Notes:

You can add more examples if you feel students need them before they work. Any ideas that concretely relate to their lives make good examples.

For more practice as a class, feel free to choose some of the easier problems from the worksheets to do together. The “easier” problems are not necessarily at the beginning of each worksheet. Also, you may decide to have students complete only part of the worksheets in class and assign the rest as homework or extra practice.

The GED Math test is 115 minutes long and includes approximately 46 questions. The questions have a focus on quantitative problem solving (45%) and algebraic problem solving (55%).

Students must be able to understand math concepts and apply them to new situations, use logical reasoning to explain their answers, evaluate and further the reasoning of others, represent real world problems algebraically and visually, and manipulate and solve algebraic expressions.

This computer-based test includes questions that may be multiple-choice, fill-in-the-blank, choose from a drop-down menu, or drag-and-drop the response from one place to another.

The purpose of the GED test is to provide students with the skills necessary to either further their education or be ready for the demands of today's careers.

Lesson 1 Warm-up: Solve the plumbing problem

Time: 10 Minutes

Write on the board: Bethany calls two plumbers to fix her broken sink. Plumber A charges a \$50 fee and \$22 an hour. Plumber B charges \$0.49 a mile each way to and from his shop and \$35 an hour.

Basic Questions:

- If Plumber A charges \$116 total, how many hours does it take to fix the sink? Write an equation, then solve.
 - $\$50 + \$22x = \$116$
 - $-\$50 \qquad -\50
 - $\$22x = \66
 - $x = 3$
- Would Plumber B be less expensive if Bethany lives 5 miles from the shop?
 - *Yes. 3 hours x \$35 = \$105 for labor, 10 miles (round trip) x \$0.49 = \$4.90, total \$105 + \$4.90 = \$109.10.*

Extension Question:

- Write an equation for Plumber B's charges. Solve.
 - $\$35 (3 \text{ hours}) + \$0.49 (10 \text{ miles}) = x$
 - $\$105 + \$4.90 = \$109.90$

Lesson 25 Activity 1: Solve Systems of Equations

Time: 20 Minutes

1. Do the problems in the **student book pages 62-63** together.
2. Review both the substitution method and the elimination/combination method with the example on page 62.
3. Use both methods to solve #1. Students may find they have a preference of one method over the other or it may depend on the numbers in the equations.
4. Have volunteers at the board working on #2 – #6 while others work at their desks.
5. Students should write their answers as (x,y) and should plug their numbers into both equations to make sure their answers are correct.

Lesson 25: Two-Variable Linear Equations

Lesson 25 Activity 2: Independent Practice

Time: 45 Minutes

1. Students can work independently on the problems in the **workbook pages 82-85**.
2. Circulate to help.
3. Have student volunteers do some of the more challenging problems on the board.

Lesson 25 Activity 3 Application: Going to the Game

Time: 25-30 Minutes

1. Students will practice writing and solving systems of equations related to buying items at a sports events. Print the activity here: <https://www.yummymath.com/wp-content/uploads/sports-systems.pdf>. They ask that you be a member to have access to solutions.
2. Give students about 5 minutes to try #1 on their own and then do it together on the board.
3. Let students work independently or in groups to solve the rest.
4. Note:
 - a. Question 7 is different in that they create their own ideas.
 - b. The answer sheet has a chart, but we want students to solve the problems with variables in equations.
5. Have volunteers write answers on the board and give them time to share their ideas for #7.

Lesson 25 Extra Time? Finish Early?

Time: 10 Minutes

Write an equation and solve this challenge problem:

Alan deposited \$175 cash in his bank account. There were no \$1 bills, but he had 3 times as many \$5 bills as \$10 bills, and the number of \$20 bills was 1 less than twice the number of \$10 bills. How many of each bill did he deposit?

Hint: Use \$10 bills as x

Number of \$5 bills = $3x$

Number of \$20 bills = $2x - 1$

$$5(3x) + 10x + 20(2x - 1) = 175$$

$$15x + 10x + 40x - 20 = 175$$

$$65x = 195$$

$$x = 3$$

He deposited 3 \$10 bills, 9 \$5 bills, and 5 \$20 bills.