Lesson 23A: Solution Sets to Simultaneous Equations

Classwork

Opening Exercise

Here is a system of two linear equations. Verify that the solution to this system is .

**Solve System of Equations Algebraically**

**Substitution Method**: Substitution allows you to create a one-variable equation.

1. Solve the following system of equations algebraically and check.

y = 2x

3x + y = 10

2. Solve the following system of equations algebraically and check.

x = 7 + 2y

y + 2x = 1

3. Solve the following system of equations algebraically and check.

2x - y = -1

y - x = 3

4. Solve the following system of equations algebraically and check.

2x - y = -1

y - x = 3

Problem Set 23A

**Use substitution to solve each system of equations and verify that your solution is true.**

1. x + 3y = 7 2. y = -3x + 11

 x = 14 + 4y 3y = 5x – 9

3. 4x + y = 13 4. y = -3x + 54

 6x – y = 7 -6x – 2y = -8

Lesson 23B: Solution Sets to Simultaneous Equations

Classwork

**Exercise 1**

**Solve System of Equations Algebraically: Combination (Addition) Method**

When both linear equations of a system are in the form of **Ax + By = C** you can solve the system using **addition**.

Solving Systems Using Addition 3x + 6y = 48

 5x – 6y = -32

**Step 1**: Look for coefficients of one

of the variables to be the opposite.

**Step 2**: Eliminate that variable by adding

**Step 3**: Combine the variables

that are not eliminated

**Step 4**: Solve for the combined variable

**Step 5**: Substitute to find the value of the

other variable.

**Step 6**: Check

**Exercise 2**

**Solving Systems Using Addition** x + 3y = 7

 x - 4y = 14

**Step 1**: Look for coefficients of one

of the variables to be the opposite.

**(multiply by -1 if they are not)**

**Step 2**: Eliminate that variable by adding

**Step 3**: Combine the variables

that are not eliminated

**Step 4**: Solve for the combined variable

**Step 5**: Substitute to find the value of the

other variable.

**Step 6**: Check

**Exercise 3**

**Solving Linear Systems by Combination using Multiplication**

**Step 1**: Look for coefficients of one 3x - 2y = -1

of the variables to be the opposite. 2x + 5y = 12

(If not multiply by a factor to create a common multiple)

**Step 2**: Eliminate that variable by adding

**Step 3**: Combine the variables

that are not eliminated

**Step 4**: Solve for the combined variable

**Step 5**: Substitute to find the value of the

other variable.

**Step 6**: Check

Why Does the Elimination Method Work?

Solve this system of linear equations algebraically.

 ORIGINAL SYSTEM NEW SYSTEM SOLUTION

 -4x + 2y = 5

 3x + 5y = 6

Problem Set 23B

Solve each system of equations by writing a new system that eliminates one of the variables.



3. Solve the following system of equations by graphing.

4x – 2y = 2

3x + 2y = 12

4. Solve the linear system using combination and check.

4x – 2y = 2

3x + 2y = 12

5. Solve the following system of equations using elimination.

3x + y = -6

-x – 2y = -3

6. Solve the following system of equations using substitution.

3x + y = -6

-x – 2y = -3

7. At a store 3 notebooks and 2 pencils cost $2.80. At the same prices, 2 notebooks and 5 pencils cost $2.60. Find the cost of one notebook and one pencil.