

**Algebra 2**  
**Unit: Systems of Equations and Inequalities**  
**Section: Systems of Equations**

**Example: Elimination Method**

**Screen 1**

Solve the following system of equations using elimination. Two  $x$  plus three  $y$  equals negative seven. Five  $x$  plus two  $y$  equals negative twenty-three. In order for elimination to work, the coefficients of one variable must be opposites of each other. Let's take a look at the  $y$ -variable. In the first equation, we have three  $y$ . In the second equation, we have two  $y$ .

By multiplying the first equation by two and the second equation by negative three, we will generate two equations with opposite  $y$  coefficients. Two times the equation two  $x$  plus three  $y$  equals negative seven. Negative three times the equation five  $x$  plus two  $y$  equals negative twenty-three.

Be very careful that when you multiply like that, you multiply the whole equation, including the right side. Four  $x$  plus six  $y$  equals negative fourteen. Negative fifteen  $x$  minus six  $y$  equals sixty-nine.

Now, when we add the corresponding parts of these two equations together, we get: Four  $x$  plus negative fifteen  $x$  equals negative eleven  $x$ ; positive six  $y$  plus negative six  $y$  equals zero  $y$ ; negative fourteen plus sixty-nine equals fifty-five.

The  $y$  has been eliminated, leaving us with negative eleven  $x$  equals fifty-five.

$x$  equals negative five

Substitute  $x$  equals negative five into one of the equations. Two  $x$  plus three  $y$  equals negative seven. Two times negative five plus three  $y$  equals negative seven.

Negative ten plus three  $y$  equals negative seven.

Three  $y$  equals three  
 $y$  equals one.

The solution is the coordinates negative five, one. Always check your answer by substituting the values into the original equations.