Section 6.3 The Elimination Method

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We have already looked at 2 methods used to solve systems of equations:

1. Graphing
2. Substitution

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We are now going to look at the third way to solve systems of equations; elimination

-This method uses opposites to eliminate one of the variables.

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Solve by elimination: (look for opposites after lining everything up).

$4x + 5y = 6$
$3x - 5y = 8$

$7x = 14$
$x = 2$

$(2, -\frac{2}{5})$

$4(2) + 5y = 6$
$-8 \quad -8$
$5y = -2$
$y = -\frac{2}{5}$

By adding the equations together straight down, the y-variable is eliminated.

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Sometimes it is necessary to multiply one or both of the equations by a number in order to produce opposites that will eliminate each other.

Example:
What variable can be eliminated? x How? mult. by -3

$3x - 2y = 4$
$-3(x + 5y = -6)$

$-3x - 15y = 18$
$3x - 2y = 4$
$-17y = 22$
$y = -\frac{22}{17}$

$\left(\frac{8}{17}, -\frac{22}{17}\right)$

$3x - 2(-\frac{22}{17}) = 4$
$3x + \frac{44}{17} = 4$
$3x = \frac{24}{17}$ $x = \frac{8}{17}$

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Solve by elimination: use mult. to create opposites

$5(3x - 4y = 10)$
$-2(5x + 7y = 3)$

$15x - 20y = 50$
$-15x - 21y = -9$
$-41y = 41$
$y = -1$

$(2, -1)$

$3x - 4(-1) = 10$
$-4 \quad -4$
$3x = 6$
$x = 2$

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Example:

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Remember that if you get a false statement as you solve a system, then the system has not solution. If you get an identity, then the system has infinitely many solutions.

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#8, 14, 20 - 26 evens,
30 - 38 evens

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