Systems of Equations in Two Variables

Solve the system: $3x + y = 20$
$2x + 3y = 18$

Solve using Substitution:

1) Isolate one variable

$3x + y = 20$
$-3x \quad -3x$
$y = 20 - 3x$

2) Use this expression in place of the variable in the other equation and solve.

$2x + 3y = 18$
$2x + 3(20 - 3x) = 18$
$2x + 60 - 9x = 18$
$60 - 7x = 18$
$-60 \quad -60$
$\frac{-7x}{-7} = \frac{-42}{-7}$ $\boxed{x = 6}$

3) Use this solution in one of the original equations and solve for the other variable.

$3x + y = 20$
$3(6) + y = 20$ $\boxed{y = 2}$
$18 + y = 20$ Solution is (6,2)

Solve using Elimination/Addition :

1) Determine LCD of one variable's coefficients, or multiply each by the other's coefficient.

LCD of x's is 6, or multiply 3 by 2, and 2 by 3
Make sure one becomes a negative.

$2(3x + y = 20) \rightarrow 6x + 2y = 40$

$-3(2x + 3y = 18) \rightarrow -6x - 9y = -54$

$-7y = -14$

2) Solve for the remaining variable.

$\frac{-7y}{-7} = \frac{-14}{-7}$ $\boxed{y = 2}$

3) Use this solution in one of the original equations and solve for the other variable.

$3x + y = 20$
$3x + 2 = 20$
$-2 \quad -2$ $\boxed{x = 6}$
$3x = 18$ Solution is (6,2)

Solve using Graphing:

Use table of values or change equations to slope-intercept form.

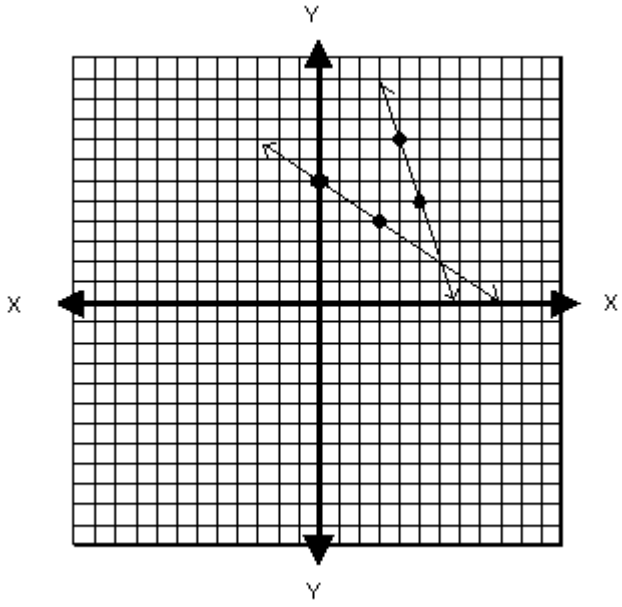
$3x + y = 20$

x	y
4	8
5	5

$2x + 3y = 18$

x	y
0	6
3	4

The lines cross at (6,2)



The solution to the system is: (6,2)

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