TOPIC: SOLVING SYSTEMS OF LINEAR EQUATIONS BY ELIMINATION

Solving Systems of Linear Equations - Elimination

◆ Another way to solve systems of equations is by _____ the equations & _____ a variable.

▶ If not asked to use a specific method, use this when equations are in standard form or have large coefficients.
$$(Ax + By = C)$$

Recall	Substitution	New	Elimination
	$y = 5x - 3$ $x = 2$		$x + y = 1$ $-x + y = 5$

EXAMPLE	Solve the system of equations using elimination.

$$3x + 2y = 1$$
$$-x + \ y = 3$$

HOW TO: Solve Systems of Equations - Elimination

1) Write BOTH equations in the form $Ax + By = C$, aligning coeff's vertically on top of each other

2) Multiply eq'n(s) by # (+ or −) so x or y coeff's are _____ with _____ signs

3) _____ equations vertically to eliminate one variable, then solve for other

4) Plug value from **3)** back into *either* eq'n, then solve

5) Check answer by plugging values into both eqn's

TOPIC: SOLVING SYSTEMS OF LINEAR EQUATIONS BY ELIMINATION

How to Multiply Equations in Elimination Method

◆ To determine what # to multiply by in Step **2)**, look at the coefficients of each equation.

Elimination Method - What to Mutiply Equation(s) by to Eliminate Variable				
If coefficients of x **or** y **are…**	**Equal with** *OPPOSITE* **sign**	**Equal with** *SAME* **sign**	**Factors of each other (Evenly divisible)**	**Anything Else**
Multiply…	Nothing! Just add	Either eq'n by -1	Eq'n with smaller coeff's by quotient	Each eq'n by *other* coeff (+ or –)
EXAMPLE	$7x + 13y = 12$ $-7x + 2y = 18$	$5x + 7y = 17$ $6x + 7y = 12$	$12x - 5y = 24$ $3x - 2y = 6$	$6x + 2y = -10$ $-4x - 3y = 15$

HOW TO: Solve Systems of Equations - Elimination
1) Write BOTH equations in the form $Ax + By = C$, aligning coeff's vertically on top of each other
2) Multiply eq'n(s) by # (+ or –) so x or y coeff's are **EQUAL** with **OPPOSITE** signs
3) ADD equations vertically to eliminate one variable, then solve for other
4) Plug value from **3)** back into *either* eq'n, then solve

TOPIC: SOLVING SYSTEMS OF LINEAR EQUATIONS BY ELIMINATION

EXAMPLE	Without *fully* solving, multiple one or both equation(s) by an appropriate factor to cancel out a variable.

Elimination Method - What to Mutiply Equation(s) by to Eliminate Variable				
If coefficients of x **or** y **are…**	**Equal with** *OPPOSITE* **sign**	**Equal with** *SAME* **sign**	**Factors of each other** **(Evenly divisible)**	**Anything Else**
Multiply…	Nothing! Just add	Either eq'n by – 1	Eq'n with smaller coeff's by quotient	Each eq'n by *other* coeff (+ or –)

(A)
$$2x + 3y = 1$$
$$x - y = 3$$

(B)
$$5x + 3y = 10$$
$$-7x + 5y = 15$$

PRACTICE   Use the elimination method to solve the following system of linear equations.

(A)

$$2x + y = 1$$
$$3x - y = 4$$

HOW TO: Solve Systems of Equations - Elimination

1) Write BOTH equations in the form $Ax + By = C$, aligning coeff's vertically on top of each other

2) Multiply eq'n(s) by # (+ or –) so x or y coeff's are **EQUAL** with **OPPOSITE** signs

3) **ADD** equations vertically to eliminate one variable, then solve for other

4) Plug value from **3)** back into *either* eq'n, then solve

5) Check answer by plugging values into both eqn's

(B)

$$10x - 4y = 5$$
$$5x - 4y = 1$$