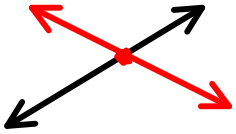
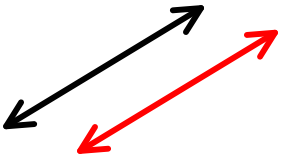
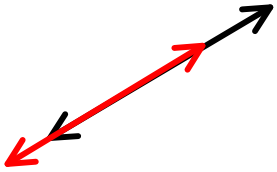
Solving Systems of Equations by Elimination/Addition



Intersecting Lines
One Solution
Consistent
Independent



Parallel Lines
No Solution
Inconsistent



Coinciding Lines
Infinite Solutions
Consistent
Dependent

Step 1: Eliminate one of the variables using "opposites". $-7x, 7x$ $2y, -2y$ $x, -x$
Step 2: Add the equations and solve for the variables.
Step 3: Check your answer.

Directions: Solve each system of equations by the elimination/addition method.

1. $-x+2y=12$
   $x+6y=20$

$-x+2y=12$
$x+6y=20$
$8y=32$
$\frac{8y}{8}=\frac{32}{8}$
$y=4$

$-x+2y=12$
$-x+2(4)=12$
$-x+8=12$
$-8\ \ -8$
$\frac{-x}{-1}=\frac{4}{-1}$
$x=-4$

Check
$x+6y=20$
$-4+6(4)=20$
$-4+24=20$
$20=20$ ✓

$x=-4\ \ y=4$

$(-4,4)$

2. $5x+3y=14$
$2x+y=6$

$5x+3y=14$
$-3(2x+y=6) \rightarrow$ $5x+3y=14$
$-6x-3y=-18$

$\frac{-1x}{-1}=\frac{-4}{-1}$

$x=4$

$5x+3y=14$
$5(4)+3y=14$
$20+3y=14$
$-20 \quad -20$
$\frac{3y}{3}=\frac{-6}{3}$
$y=-2$

Check
$2x+y=6$
$2(4)+(-2)=6$
$8+-2=6$
$6=6$ ✓

$(4,-2)$

3. $7x=5-2y$
$3y=16-2x$

$3(7x+2y=5)$
$-2(2x+3y=16)$

$21x+6y=15$
$-4x-6y=-32$

$\frac{17x}{17}=\frac{-17}{17}$

$x=-1$

$7x=5-2y$
$7(-1)=5-2y$
$-7=5-2y$
$-5 \quad -5$
$\frac{-12}{-2}=\frac{-2y}{-2}$
$y=6$

Check
$3y=16-2x$
$3(6)=16-2(-1)$
$18=16+2$
$18=18$ ✓

$(-1,6)$

4. $\frac{1}{3}x+\frac{1}{4}y=10$
$-\frac{2}{3}x-\frac{1}{2}y=4$

$\frac{4 \cdot x}{4 \cdot 3}+\frac{y \cdot 3}{4 \cdot 3}=\frac{10 \cdot 12}{1 \cdot 12}$

LCD=12

$\frac{4x}{12}+\frac{3y}{12}=\frac{120}{12}$

$4x+3y=120$

LCD=6

$\frac{-2x \cdot 2}{3 \cdot 2}-\frac{y \cdot 3}{2 \cdot 3}=\frac{4 \cdot 6}{1 \cdot 6}$

$\frac{-4x}{6}-\frac{3y}{6}=\frac{24}{6}$

$-4x-3y=24$

$4x+3y=120$
$-4x-3y=24$
$0 \neq 144$

NO solution
INCONSISTENT

5. $.03x - .06y = 9$
$x - 2y = 300$

$3x - 6y = 900$
$-3(x - 2y = 300)$

$3x - 6y = 900$
$-3x + 6y = -900$
$0 = 0$

infinite solutions
consistent &
dependent