Warm up

Solve by substitution

1) $x+y=12$

$x-y=4$

$x+y=12$

$-x \quad -x$

$y=-x+12$

$x+y=12$

$x+4=12$

$-4 \quad -4$

$x=8$

$-y+12-x=4$

$-12 \quad -12$

$-2y=-8$

$\frac{-2y}{-2}=\frac{-8}{-2}$

$y=4$

$(8,4)$

2) $3x+9y=75$

$8x+5y=67$

$3x+9y=75$

$-9y \quad -9y$

$\frac{3x}{3}=\frac{75}{3}-\frac{9y}{3}$

$x=25-3y$

$8(25-3y)+5y=67$

$200-24y+5y=67$

$200-19y=67$

$-200 \quad -200$

$\frac{-19y}{-19}=\frac{-133}{-19}$

$y=7$

$8x+5(7)=67$

$8x+35=67$

$-35 \quad -35$

$\frac{8x}{8}=\frac{32}{8}$

$x=4$

$(4,7)$

How Do You Solve a System of Equations by Elimination?

Step 1: Decide whether to eliminate X or y

Step 2: Multiply top by -2 and bottom 3

Step 3: Add

Step 4: solve for y

Step 5: plug in y value to solve for X

$3x + 2y = -6$
$2x + 5y = 7$

Eliminate x or y? X

-2 → $-6x - 4y = 12$
3 → $6x + 15y = 21$

Multiply 1st by -2
Multiply 2nd by 3

$-6x - 4y = 12$
$+ \ 6x + 15y = 21$
$11y = 33$

$\frac{11y}{11} = \frac{33}{11}$

$y = 3$

$3x + 2(3) = -6$
$3x + 6 = -6$
$-6 \quad -6$
$\frac{3x}{3} = \frac{-12}{3}$
$x = -4$

(-4, 3)

$-8x - 10y = 24$
$6x + 5y = 2$

$-8x - 10y = 24$
$6x + 5y = 2$

Eliminate x or y? _____

1 → $-8x - 10y = 24$
2 → $12x + 10y = 4$

Multiply 1st by _____
Multiply 2nd by _____

$-8x - 10y = 24$
$+ \ 12x + 10y = 4$
$4x = 28$

$\frac{4x}{4} = \frac{28}{4}$

$x = 7$

$6(7) + 5y = 2$
$42 + 5y = 2$
$-42 \quad -42$
$\frac{5y}{5} = \frac{-40}{5}$

$y = -8$

(7, -8)

Solve the systems using elimination.

1. $x - y = 11$
   $2x + y = 19$

   $3x = 30$, $\frac{3x}{3} = \frac{30}{3}$, $x = 10$

   $10 - y = 11$, $-10 \quad -10$, $-y = 1$, $y = -1$

   $(10, -1)$

2. $5x + y = 9$
   $10x - 7y = -18$

3. $-4x + 9y = 9$
   $x - 3y = -6$

4. $-3x + 7y = -16$
   $-9x + 5y = 16$

   $-3(-4, -4)$

   $-3x + 7(-4) = -16$

   $9x - 21y = 48$, $-3x - 28 = -16$, $+28 \quad +28$

   $-9x + 5y = 16$, $-3x = 12$, $\frac{-3x}{-3} = \frac{12}{-3}$, $-3x = -4$

   $-16y = 64$, $\frac{-16y}{-16} = \frac{64}{-16}$, $y = -4$

5. $6x - 12y = 24$
   $-x - 6y = 4$

6. $-7x + y = -19$
   $-2x + 3y = -19$

7. $8x + y = -16$
   $-3x + y = -5$

   $-1(8x + y = -16)$, $-8x - y = 16$

   $-3x + y = -5$

   $-11x = 11$, $\frac{-11x}{-11} = \frac{11}{-11}$, $x = -1$

   $8(-1) + y = -16$, $-8 + y = -16$, $+8 \quad +8$, $y = -8$

   $(-1, -8)$

8. $-3x + 3y = 4$
   $-3(-x + y = 3)$

   $-3x + 3y = 4$

   $3x - 3y = -9$

   $0 = -5$

   No Solution

9. $2(2x + 8y = 6)$
   $-4x - 16y = -12$

   $4x + 16y = 12$

   $-4x - 16y = -12$

   $0 = 0$

   Infinite Solutions