Warmup 12/9/19

Solve the following system using substitution.

$x=3y-2$

$4x-3y=1$

$4(3y-2)-3y=1$

$12y-8-3y=1$

$9y-8=1$

$+8 \quad +8$

$\frac{9y}{9}=\frac{9}{9}$

$y=1$

$3(1)-2=1$

$x=1$

$(1,1)$

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 by 3.

Step 3: Add

Step 4: Solve for y

Step 5: plug in for y and 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

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

$\frac{11y}{11} = \frac{33}{11}$
$y = 3$

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

$(-4, 3)$

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

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

Eliminate x or y? y

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

Multiply 1st by 1
Multiply 2nd by 2

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

$\frac{4x}{4} = \frac{28}{4}$
$x = 7$

$6(7) + 5y = 2$
$42 + 5y = 2$
$-42 \quad -42$
$\frac{5y}{5} = \frac{-40}{5}$
$y = -8$

$(7, -8)$

Solve the systems using elimination.

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

   $3x = 30$, $x = 10$

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

   $(10, -1)$

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

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

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

   $9x - 21y = 48$
   $-9x + 5y = 16$

   $-16y = 64$, $y = -4$

   $-3x + 7(-4) = -16$, $-3x - 28 = -16$, $-3x = 12$, $x = -4$

   $(-4, -4)$

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

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

   $21x - 3y = 57$
   $-2x + 3y = -19$

   $19x = 38$, $x = 2$

   $-7(2) + y = -19$, $-14 + y = -19$, $y = -5$

   $(2, -5)$

7. $8x + y = -16$
   $-1(-3x + y = -5)$

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

   $11x = -11$, $x = -1$

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

   $(-1, -8)$

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

$$-4x-15y=-17$$
$$-x+5y=-13$$