Linear Combination

- Add EQ together to get only one var.

$(x - 2y = 5)(-4)$

$4x + 3y = 9$

$+ \; -4x + 8y = -20$

$0 + 11y = -11$

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

$y = -1$

* we need equal + opposite coefficients on on var.

- now we find x, by plugging in y.

$x - 2(-1) = 5$

$x + 2 = 5$

$-2 \quad -2$

$x = 3$

$(3, -1)$

$(3x + 2y = 4)\,2$

$(2x - 5y = -29)\,3$

*multiply each eq by other EQ's coefficient.

$$\begin{array}{r} 6x + 4y = 8 \\ +\,-6x + 15y = +87 \\ \hline 19y = 95 \end{array}$$

$$\frac{19y}{19} = \frac{95}{19}$$

$$y = 5$$

$$2x - 5(5) = -29$$

$$2x - 25 = -29$$

$$+25 \quad +25$$

$$\frac{2x}{2} = \frac{-4}{2}$$

$$x = -2$$

• change signs in one EQ to get opposite sign

$$(-2, 5)$$

$(4x - y = 9)5$

$(3x - 5y = 11)(1)$

$+ 20x + 5y = 45$

$-17x = -34$

$-17 \quad -17$

$x = 2$

$4(2) - y = 9$

$8 - y = 9$

$-8 \quad -8$

$-y = 1$

$-1 \quad -1$

$y = -1$

$(2, -1)$

$3(4x - y = 9)$

$4(3x - 5y = 11)$

$12x - 3y = 27$

$-12x + 20y = -44$

$+17y = -17$

$+17 \quad +17$

$y = -1$

$4x + +1 = 9$

$-1 \quad -1$

$\frac{4x = 8}{4}$

$x = 2$

$(2, -1)$

$(2x + 3y = 16)3$

$(3x - 7y = -1)2$

$6x + 9y = 48$

$+ -6x + 14y = +2$

$23y = 50$

$\frac{23}{23}$

$y = 50/23$

$2x + 3(50/23) = 16$

$(2x + \frac{150}{23} = 16)23$

$46x + 150 = 368$

-150

$\frac{46x = 218}{46}$

$x = 109/23$

$\left(\frac{109}{23}, \frac{50}{23}\right)$

$3x - 7y = -1$

$3x - 7(\frac{50}{23}) = -1$

$(3x - \frac{350}{23} = -1)23$

$69x - 350 = -23$

$+350$

$\frac{69x = 327}{69}$

$x = \frac{109}{23}$

$(2x - y = 7)\,2$

$(4x - 2y = 9)\,1$

$+\ -4x + 2y = -14$

$0 + 0 = -5$

$0 = -5$

No Solution

your turn!

1. $2x - y = 4$
   $2x + 3y = -12$

2. $4x + 3y = 5$
   $2x - 5y = -17$