Sec 3-2. Solving Systems Algebraically

Solve. $4x - 6y = 22$, $y = 4x - 7$

$4x - 6(4x - 7) = 22$

$4x - 24x + 42 = 22$

$-20x + 42 = 22$

$-42 \quad -42$

$-20x = -20$

$x = 1$ now find y

$y = 4(1) - 7$

$(1, -3)$

Solve. elim y

$2(7x + 12y = 123)$

$3(11x + 8y = 139)$

$33x + 24y = 417$

$-\ 14x + 24y = 246$

$\frac{19x}{19} = \frac{171}{19}$ $x = 9$

$(9, 5)$

Find y:

$11(9) + 8y = 139$

$99 + 8y = 139$

$8y = 40$

Solve. Could you use substitution? Yes, you'd have to solve one of the equations for either x or y first.

$6x + 2y = -14$ $\longrightarrow$ $y = \frac{-14 - 6x}{2} = -7 - 3x$

$8x - 17y = 119$

$8x - 17(-7 - 3x) = 119$

$8x + 119 + 51x = 119$

$59x + 119 = 119$

$-119 \quad -119$

$59x = 0$

$x = 0$ now find y. $y = -7 - 3(0) = -7$

Sol: (0, -7)

Solve. Could you use elimination? Yes, you could just subtract the equations and eliminate y.

$y = 2x - 14$

$-\ \ y = -3x + 16$

$0 = 5x - 30$

$30 = 5x$

$6 = x$ $\longrightarrow$ Now find y. $\longrightarrow$ $y = 2(6) - 14$

$y = -2$

sol: (6, -2)

Solve. $3(-6x + 4y = 36)$

$2(9x - 6y = 96)$

$$\begin{array}{r} -18x + 12y = 108 \\ +\ 18x - 12y = 192 \\ \hline 0 = 300 \end{array}$$

NO SOL

Solve.

$21(15x - 20y = 35)$

$15(-21x + 28y = -49)$

$$\begin{array}{r} 315x - 420y = 735 \\ -315x + 420y = -735 \\ \hline 0 = 0 \end{array}$$

TRUE → many sol's

On Mr. Brown's farm there are only turkeys and pigs. One day he started counting and found out that there were a total 45 heads and 129 legs amongst the animals.

Write and solve a system of equations to find the number of each kind of animal on Mr. Brown's farm.

T = # Turkeys

P = # pigs

$2(T + P = 45)$

$$\begin{array}{r} 2T + 4p = 130 \\ -\ 2T + 2p = 90 \\ \hline 2p = 40 \end{array}$$

$p = 20$

20 pigs

25 Turkeys

You have only nickels and dimes in your piggy bank. One day you dumped out all the coins and found out that there were 75 coins that added up to $5.40.

Write and solve a system of equations to find the number of dimes and nickels that were in your piggy bank.

D = # dimes

N = # Nickels

$D + N = 75$

$.10D + .05N = 5.40$

You can now solve using Elimination or Substitution.