Solving Systems using Elimination

$7x - 3y = 65$

$2x + 3y = 34$ **Problem?? No easy way to get a x = or y = equation.**

But all we need to do is eliminate a variable … and those y's are lined up nicely

Since $-3 + 3 = 0$ we could add the equations together

$$7x - 3y = 65$$
$$+ \quad 2x + 3y = 34$$
$$9x \quad = 99 \qquad \rightarrow x = 11 \qquad \text{so } 7(11) - 3y = 65 \quad -3y = -12 \qquad y = -4$$

This method only works if you have matching coefficients in a pair of variables

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Solve the following

a) $9x + 8y = 13$

$6x - 4y = -10$ *no match-up so multiply equation 2 by 2   (8 + − 8 = 0 so add)*

$$9x + 8y = 13$$
$$+ \quad \underline{12x - 8y = -20}$$
$$21x \quad = -7 \qquad x = -⅓ \qquad \text{so } 9(-⅓) + 8y = 13 \quad 8y = 16 \qquad y = 2 \qquad \text{or } (-⅓, 2)$$

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b) $13x + 5y = 7$ *x3*

$10x + 3y = 2$ *x5*   *no match-up so multiply eq #1 by 3, eq #2 by 5 (15 − 15 = 0 so subtract)*

$$39x + 15y = 21$$
$$- \quad \underline{50x + 15y = 10}$$
$$-11x \quad = \quad 11 \qquad x = -1 \qquad \text{so } 13(-1) + 5y = 7 \quad 5y = 20 \qquad y = 4 \qquad \text{or } (-1, 4)$$

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c) $7x - 5y = 11$ *x9*

$9x + 3y = 10$ *x7   (same signs so -)*

$$63x - 45y = 99$$
$$- \quad \underline{63x + 21y = 70}$$
$$-66y = 29 \qquad y = \frac{-29}{66} \quad \text{so } 7x = 11 + 5\left(\frac{-29}{66}\right) \quad 7x = \frac{581}{66} \quad x = \frac{83}{66} \text{ or } \left(\frac{83}{66}, \frac{-29}{66}\right)$$

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d) $x - 10y = 23$ *x2*

$2x + 20y = 11$

$$2x - 20y = 46 \qquad \text{+ to remove y's , - to remove x's we will -}$$
$$- \quad \underline{2x + 20y = 11}$$
$$-40y = 35 \qquad y = \frac{-7}{8} \quad \text{so } x = 23 + 10\left(\frac{-7}{8}\right) \quad x = \frac{57}{4} \qquad \qquad \text{or } \left(\frac{57}{4}, \frac{-7}{8}\right)$$

> **Assignment = worksheet**

Did you hear about... **(Solve with Elimination Sheet)**

A	B	C	D	E	F
THE					
G	H	I	J	K	L
BIRDSEED					?

B $3x - 5y = 13$
$x - 2y = 5$

L $5x + 6y = -11$
$3x + y = -4$

C $7x + 2y = -1$
$3x - 4y = 19$

J $4x - 3y = -20$
$-x - 8y = 5$

F $7x - 3y = -5$
$3x + 2y = 11$

D $x + 2y = 6$
$5x + 3y = 2$

K $-3x + 7y = -1$
$-2x + 5y = 0$

E $2x + 3y = 7$
$3x + 4y = 10$

H $4x + 3y = 9$
$3x + 4y = 12$

I $5x - 3y = 16$
$4x + 5y = -2$

Now complete Pg. 437 #6, 7

ANSWERS

COWS (1, 4)	TWEET (1, 2)
MILK (−1, −1)	HIS (2, 1)
FARMER (1, −2)	SELLING (−5, 0)
AND (0, 3)	BIRDSEED (−1, −2)
WINGS (2, −4)	UDDER (2, 0)
WHO (1, −4)	THE (2, 3)
MOO (1, 3)	SINGING (−5, 4)
CHEEP (5, 2)	STARTED (2, −2)
BEEF (3, −2)	FED (−2, 4)
	BUTTER (−1, 3)