

Did You Hear About...

A THE	B FARMER	C WHO	D FED	E HIS	F COW
G BIRDSEED	H AND	I STARTED	J SELLING	K CHEEP	L MILK?

Solve each system of equations below using multiplication with the addition method. Find the solution in the answer column and notice the word next to it. Write this word in the box containing the letter of that exercise. Keep working and you will hear about some "udder" nonsense.

(A) $5x - 2y = 4$
 $3x + y = 9$ (2, 3)

(G) $3x - 5y = 7$ (-1, -2)
 $5x - 2y = -1$

(B) $3x - 5y = 13$
 $x - 2y = 5$ (1, -2)

(H) $4x + 3y = 9$ (0, 3)
 $3x + 4y = 12$

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

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

(D) $x + 2y = 6$ (-2, 4)
 $5x + 3y = 2$

(J) $4x - 3y = -20$
 $-x - 8y = 5$ (-5, 0)
 $-4x - 32y = 20$

(E) $2x + 3y = 7$ (2, 1)
 $3x + 4y = 10$

(K) $-3x + 7y = -1$ } $\times 2$
 $-2x + 5y = 0$ } $\times 3$ (5, 2)
 $-6x + 14y = -2$
 $6x - 15y = 0$
 $-y = -2$

(F) $7x - 3y = -5$ (1, 4)
 $3x + 2y = 11$

(L) $5x + 6y = -11$ (-1, -1)
 $3x + y = -4$ } $\times 6$
 $-18x - 6y = 24$
 $-13x = 13$

$-21x + 9y = 15$ $3x + 8 = 11$
 $21x + 14y = 77$ $3x = 3$
 $x = 1$

$23y = 92$
 $y = 4$

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

OBJECTIVE 6-1: To solve systems of equations using multiplication with the addition method (equations are in standard form).

What Do You Get If You Drop a Grand Piano Down a Mine Shaft?

Solve each system of equations below using multiplication with the addition method. Find the solution at the bottom of the page and write the letter of that exercise in the box above it.

A $\begin{cases} 2(x-y) = 4 & x-y = 2 \\ 3x+y = 10 & 3x+y = 10 \end{cases}$
 Divided
 $\begin{array}{r} 2x - y = 2 \\ 3x + y = 10 \\ \hline 4x = 12 \\ x = 3 \end{array}$

I $\begin{cases} a-2b = -5 & a-2b = -5 \\ 3(2a+b) = 0 & 6a+3b = 0 \end{cases}$
 $\begin{array}{r} a - 2b = -5 \\ 6a + 3b = 0 \\ \hline 5a = -5 \end{array}$
 Divided
 $\begin{array}{r} 5a = -5 \\ a = -1 \end{array}$

R $\begin{cases} 5x-y = 2x+9 & 3x-y = 9 \\ 3x+4y = -6 & -3x+4y = -6 \end{cases}$
 $\begin{array}{r} 3x - y = 9 \\ -3x + 4y = -6 \\ \hline -5y = -3 \\ y = \frac{3}{5} \end{array}$

T $\begin{cases} 2(x-3y) = x+4 & \text{(PACKET)} \\ 3x+8 = 5x-y & (4,0) \end{cases}$

A $\begin{cases} \frac{1}{3}(2x+y) = 1 & 2x+y = 3 \\ x+y = 4 & x+y = 4 \end{cases}$
 * reciprocal
 $\begin{array}{r} 2x + y = 3 \\ -x + y = 4 \\ \hline x = -1 \end{array}$

O $\begin{cases} \frac{1}{2}(m-3n) = 5 & m-3n = 10 \\ 3(m+4n) = -12 & m+4n = -4 \end{cases}$
 * reciprocal
 $\begin{array}{r} m - 3n = 10 \\ m + 4n = -4 \\ \hline -7n = -14 \\ n = 2 \end{array}$
 Divide
 $\begin{array}{r} m - 3(2) = 10 \\ m - 6 = 10 \\ m = 16 \end{array}$

F $\begin{cases} \frac{x}{3} + \frac{y}{2} = -4 & 2x+3y = -24 \\ x-3y = 6 & x-3y = 6 \end{cases}$
 $\begin{array}{r} 2x + 3y = -24 \\ x - 3y = 6 \\ \hline 3x = -18 \\ x = -6 \end{array}$

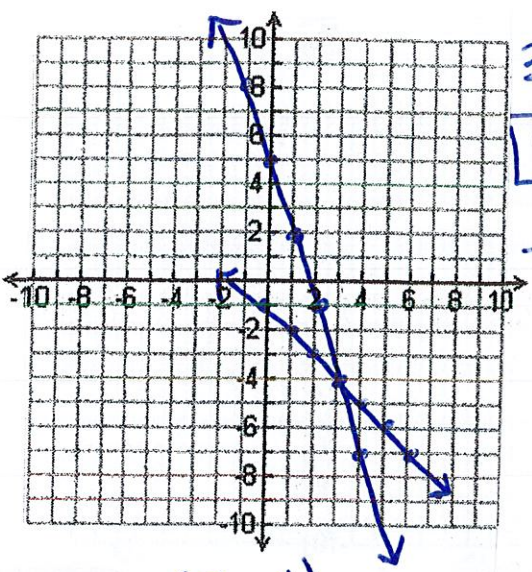
M $\begin{cases} \frac{x}{2} + \frac{y}{5} = \frac{13}{10} & 5x+2y = 13 \\ 3(x-y) = x-10 & 2x-3y = -10 \end{cases}$
 $\begin{array}{r} 5x + 2y = 13 \\ 2x - 3y = -10 \\ \hline 3x - 3y = -20 \\ 4x - 6y = -20 \\ \hline 10x = 10 \\ x = 1 \end{array}$

N $\begin{cases} \frac{1}{5}(x+2y) = -2 & x+2y = -10 \\ \frac{x}{4} - \frac{3y}{2} = \frac{15}{2} & x-6y = 30 \end{cases}$
 $\begin{array}{r} x + 2y = -10 \\ x - 6y = 30 \\ \hline 8y = -40 \\ y = -5 \end{array}$

L $\begin{cases} \frac{a}{6} + \frac{b}{4} = \frac{5}{2} & \text{(PACKET)} \\ \frac{2a}{3} - \frac{b}{2} = -2 & (3,8) \end{cases}$

	A		F	L	A	T		M	I	N	O	R
(4, -3)	(3, -4)	(-6, -4)	(3, 8)	(3, 1)	(2, -5)	(1, 4)	(0, -5)	(2, -3)	(-1, 2)	(4, -2)	(-6, 0)	
(-1, 5)	(-1, 1)	(3, 8)	(4, 0)	(1, -2)								

①



(3, -4)

$$3x + y = 5$$

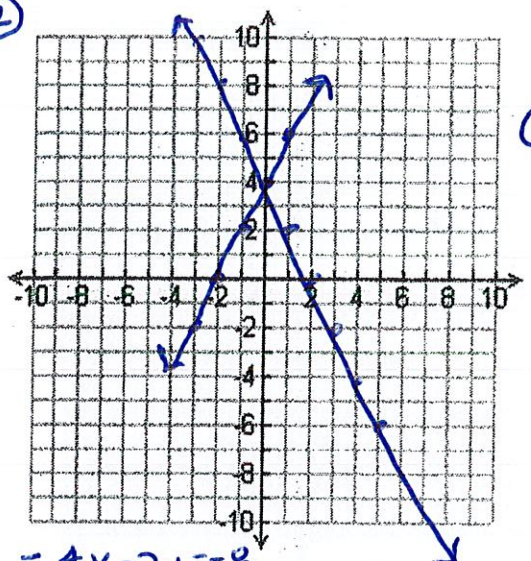
$$y = -3x + 5$$

$$-x - y = 1$$

$$-y = x + 1$$

$$y = -x - 1$$

②



(0, 4)

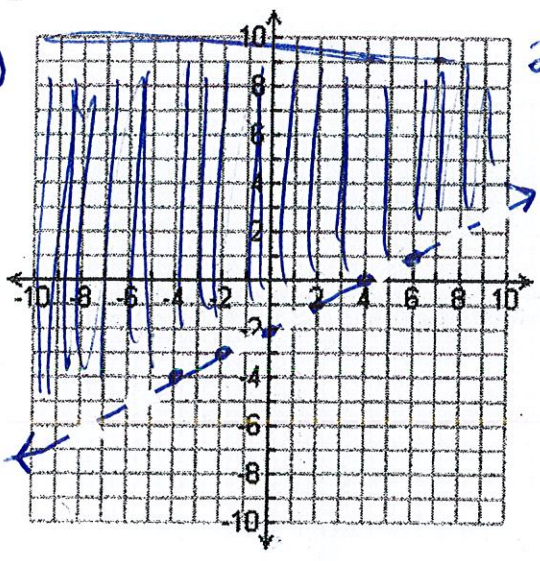
$$-4x - 2y = -8$$

$$-2y = 4x - 8$$

$$y = -2x + 4$$

$$y = 2x + 4$$

⑨

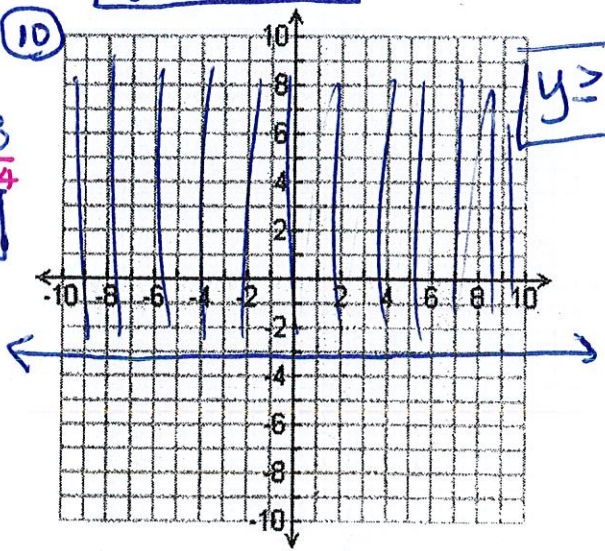


$$2x - 4y < 8$$

$$\frac{-4y}{-4} < \frac{-2x + 8}{-4}$$

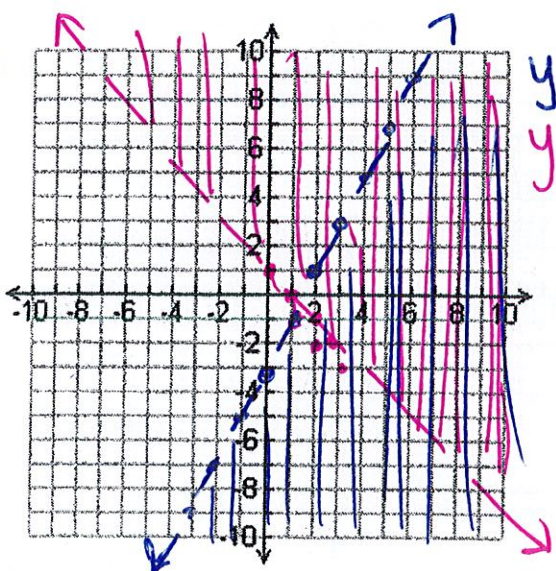
$$y > \frac{1}{2}x - 2$$

⑩



$$y \geq -3$$

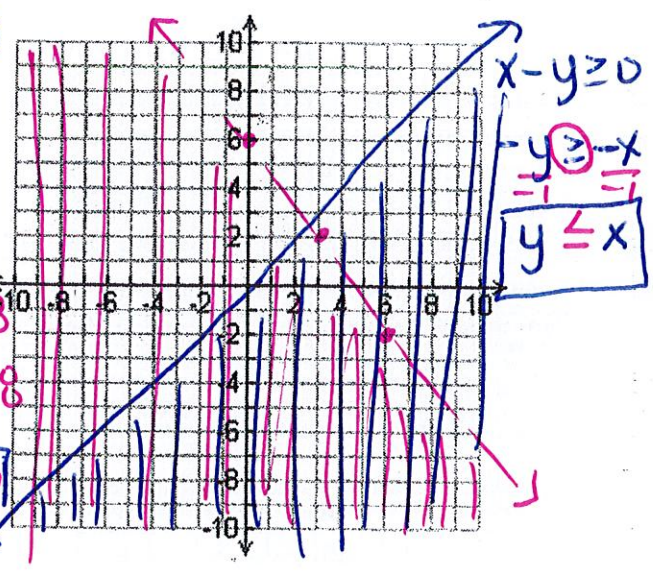
⑪



$$y < 2x - 3$$

$$y > -x + 1$$

⑫



$$4x + 3y < 18$$

$$3y < -4x + 18$$

$$y < \frac{-4}{3}x + 6$$

$$x - y \geq 0$$

$$-y \geq -x$$

$$y \leq x$$

$$\textcircled{3} \quad \begin{aligned} 2x + 5y &= -7 \\ 7x + y &= -8 \rightarrow y = -7x - 8 \end{aligned}$$

$$2x + 5(-7x - 8) = -7$$

$$2x - 35x - 40 = -7$$

$$-33x - 40 = -7$$

$$\begin{array}{r} +40 \quad +40 \\ -33x = 33 \\ \hline -33 \quad -33 \end{array}$$

$$x = -1$$

$$\begin{aligned} y &= -7(-1) - 8 \\ &= 7 - 8 \\ &= -1 \end{aligned}$$

$(-1, -1)$

$$\textcircled{4} \quad \begin{aligned} x - 3y &= -24 \rightarrow x = 3y - 24 \\ 5x + 8y &= -5 \end{aligned}$$

$$5(3y - 24) + 8y = -5$$

$$\begin{aligned} 15y - 120 + 8y &= -5 \\ 23y - 120 &= -5 \\ +120 \quad +120 \end{aligned}$$

$$\begin{array}{r} 23y = 115 \\ \hline 23 \quad 23 \end{array}$$

$$y = 5$$

$$\begin{aligned} x &= 3(5) - 24 \\ &= 15 - 24 \\ &= -9 \end{aligned}$$

$(-9, 5)$

$$\begin{array}{r} \textcircled{5} \quad x + 2y = 3 \\ 5x + 3y = 8 \end{array} \quad] -5$$

$$\downarrow 5x + 3(1) = 8$$

$$5x + 3 = 8$$

$$5x = 5$$

$$x = 1$$

$$\begin{array}{r} -5x - 10y = -15 \\ + 5x + 3y = 8 \\ \hline -7y = -7 \\ y = 1 \end{array}$$

$(1, 1)$

$$\begin{array}{r} \textcircled{6} \quad 2x = 8y - 2 \rightarrow 2x - 8y = -2 \\ 3x - 3y = 15 \rightarrow 3x - 3y = 15 \end{array} \quad \begin{array}{l}] -3 \\] 2 \end{array}$$

$$\begin{array}{r} -6x + 24y = 6 \\ + 6x - 6y = 30 \\ \hline \end{array}$$

$$18y = 36$$

$$y = 2$$

$(7, 2)$

$$\downarrow 3x - 3(2) = 15$$

$$3x - 6 = 15$$

$$3x = 21$$

$$x = 7$$

⑦ $x = \$$ of candy
 $y = \$$ of popcorn

* Need x b/c $x = \$$ of candy
 * Eliminate y

Substitution

$$\begin{aligned} 3x + 2y &= 18.35 \\ 4x + 3y &= 26.05 \end{aligned}$$

* Not a good option*
 * When isolating 1 variable gives you fractions
 Use Elimination*

Elimination

$$\begin{aligned} -3[3x + 2y &= 18.35 \\ 2[4x + 3y &= 26.05 \end{aligned}$$

$$\begin{aligned} -9x - 6y &= -55.05 \\ + 8x + 6y &= 52.10 \\ \hline -x &= -2.95 \end{aligned}$$

$$x = 2.95$$

Box of candy cost \$2.95

⑧ $x = \#$ of pennies
 $y = \#$ of quarters

Mr. Delaney has 57 pennies

* Need x b/c $x = \#$ of pennies
 * Eliminate y

Substitution

$$\begin{aligned} .01x + .25y &= 16.32 \\ x + y &= 120 \rightarrow y = -x + 120 \end{aligned}$$

$$\begin{aligned} .01x + .25(-x + 120) &= 16.32 \\ .01x - .25x + 30 &= 16.32 \\ -.24x + 30 &= 16.32 \\ \underline{-30} \quad \underline{-30} \\ -.24x &= -13.68 \end{aligned}$$

Elimination

$$\begin{aligned} .01x + .25y &= 16.32 \\ - .25[x + y &= 120] \\ \hline .01x + .25y &= 16.32 \\ + -.25x - .25y &= -30 \\ \hline -.24x &= -13.68 \\ x &= 57 \end{aligned}$$