

Why Did the Ghost Decide to Haunt City Hall?

Solve each system of equations below by the substitution method. Find the solution in the nearest answer column and notice the two letters next to it. Print these letters in the two boxes at the bottom of the page that contain the number of that exercise.

Answers 1-6:

(4, 2)	ST
(6, -1)	TO
(1, 2)	SA
(4, 8)	IT
(1, -3)	NT
(6, -3)	TH
(5, 3)	BE
(9, 2)	ED
(7, 3)	HA
(5, 2)	WA

Answers 7-12:

($\frac{1}{2}, -3$)	ER
(8, $-\frac{1}{2}$)	TE
($-\frac{1}{3}, \frac{4}{3}$)	IG
(8, 0)	RE
(-3, 4)	ST
($\frac{1}{2}, 7$)	EN
($\frac{5}{2}, \frac{4}{3}$)	EX
(-1, 4)	TH
($\frac{5}{2}, -\frac{1}{2}$)	MA
(-4, -3)	HT

- | | |
|-----------------------------------|----------------------|
| ① $y = 2x$
$x + y = 12$ | (4, 8) |
| ② $x = 3y - 1$
$x + 2y = 9$ | (5, 2) |
| ③ $y = 2x - 5$
$4x - y = 7$ | (1, -3) |
| ④ $2x - 3y = 12$
$x = 4y + 1$ | (9, 2) |
| ⑤ $y = -x + 5$
$x - 4y = 10$ | (6, -1) |
| ⑥ $x - y = 2$
$4x - 3y = 11$ | (5, 3) |
| ⑦ $-2x + 3y = 14$
$x + 2y = 7$ | (-1, 4) |
| ⑧ $6x - y = -4$
$2x + 2y = 15$ | ($\frac{1}{2}, 7$) |
| ⑨ $x + y = 1$
$2x - y = -2$ | |
| ⑩ $5x - 3y = -11$
$x - 2y = 2$ | |
| ⑪ $x - y = 3$
$6x + 4y = 13$ | |
| ⑫ $2x - y = 16$
$-x + 2y = -8$ | |

1	2	3	4	5	6	7	8	9	10	11	12
I	A	N	E	T	O	T	H	I	H	M	A
					B		E				R
											E

KEY

① $y = 2x$

$x + 2x = 12$

$\frac{3x}{3} = \frac{12}{3}$

$x = 4$

$y = 2(4)$

$y = 8$

$(4, 8)$

② $x = 3y - 1$

$3y - 1 + 2y = 9$

$5y - 1 = 9$

$\frac{10y}{5} = \frac{10}{5}$

$y = 2$

$x = 3(2) - 1$

$x = 5$

$(5, 2)$

③ $y = 2x - 5$

$4x - (2x - 5) = 7$

$4x - 2x + 5 = 7$

$2x + 5 = 7$

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

$x = 1$

$y = 2(1) - 5$

$y = -3$

$(1, -3)$

④ $x = 4y + 1$

$2(4y + 1) - 3y = 12$

$8y + 2 - 3y = 12$

$5y + 2 = 12$

$\frac{10y}{5} = \frac{10}{5}$

$y = 2$

$x = 4(2) + 1$

$x = 9$

$(9, 2)$

⑤ $y = -x + 5$

$x - 4(-x + 5) = 10$

$x + 4x - 20 = 10$

$5x - 20 = 10$

$\frac{30x}{5} = \frac{30}{5}$

$x = 6$

$y = -6 + 5$

$y = -1$

$(6, -1)$

⑥ $x - y = 2$

$\hookrightarrow x = y + 2$

$4(y + 2) - 3y = 11$

$4y + 8 - 3y = 11$

$y + 8 = 11$

$y = 3$

$x = 3 + 2$

$x = 5$

$(5, 3)$

⑦ $x + 2y = 7$

$\hookrightarrow x = -2y + 7$

$-2(-2y + 7) + 3y = 14$

$4y - 14 + 3y = 14$

$7y - 14 = 14$

$\frac{28y}{7} = \frac{28}{7}$

$y = 4$

$x = -2(4) + 7$

$x = -1$

$(-1, 4)$

⑧ $6x - y = -4$

$\hookrightarrow 6x + 4 = y$

$2x + 2(6x + 4) = 15$

$2x + 12x + 8 = 15$

$14x + 8 = 15$

$\frac{7x}{14} = \frac{7}{14}$

$x = \frac{7}{14} = \frac{1}{2}$

$y = 6(\frac{1}{2}) + 4$

$y = 3 + 4 = 7$

$(\frac{1}{2}, 7)$

$$\textcircled{9} \quad x + y = 1$$

$$\hookrightarrow x = -y + 1$$

$$2(-y + 1) - y = -2$$

$$-2y + 2 - y = -2$$

$$-3y + 2 = -2$$

$$\begin{array}{r} -2 \\ -2 \end{array}$$

$$-3y = -4$$

$$y = \frac{4}{3}$$

$$x = -\left(\frac{4}{3}\right) + 1$$

$$x = -\frac{4}{3} + \frac{3}{3}$$

$$x = -\frac{1}{3}$$

$$\boxed{\left(-\frac{1}{3}, \frac{4}{3}\right)}$$

$$\textcircled{10} \quad x - 2y = 2$$

$$\hookrightarrow x = 2y + 2$$

$$5(2y + 2) - 3y = -11$$

$$10y + 10 - 3y = -11$$

$$7y + 10 = -11$$

$$\begin{array}{r} -10 \\ -10 \end{array}$$

$$7y = -21$$

$$y = -3$$

$$x = 2(-3) + 2$$

$$x = -4$$

$$\boxed{(-4, -3)}$$

$$\textcircled{11} \quad x - y = 3$$

$$\hookrightarrow x = y + 3$$

$$6(y + 3) + 4y = 13$$

$$6y + 18 + 4y = 13$$

$$10y + 18 = 13$$

$$\begin{array}{r} -18 \\ -18 \end{array}$$

$$10y = -5$$

$$y = -\frac{1}{2}$$

$$x = -\frac{1}{2} + 3$$

$$x = -\frac{1}{2} + \frac{6}{2}$$

$$x = \frac{5}{2}$$

$$\boxed{\left(\frac{5}{2}, -\frac{1}{2}\right)}$$

$$\textcircled{12} \quad -x + 2y = -8$$

$$\hookrightarrow 2y + 8 = x$$

$$2(2y + 8) - y = 16$$

$$4y + 16 - y = 16$$

$$3y + 16 = 16$$

$$\begin{array}{r} -16 \\ -16 \end{array}$$

$$3y = 0$$

$$y = 0$$

$$x = 2(0) + 8$$

$$x = 8$$

$$\boxed{(8, 0)}$$