

Practice 4.2

Solve the following systems of linear equations using substitution:

$$1. \begin{aligned} 5x + 3y &= -1 \\ y &= -3x - 3 \end{aligned}$$

$$\begin{aligned} 5x + 3(-3x - 3) &= -1 \\ 5x - 9x - 9 &= -1 \\ -4x &= 8 \\ x &= -2 \end{aligned}$$

$$\begin{aligned} y &= -3x - 3 \\ y &= -3(-2) - 3 \\ y &= 3 \end{aligned}$$

$(-2, 3)$

$$2. \begin{aligned} 8x - y &= 16 \\ y &= -8x \end{aligned}$$

$$\begin{aligned} 8x - (-8x) &= 16 \\ 16x &= 16 \\ x &= 1 \end{aligned}$$

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

$(1, -8)$

$$3. \begin{aligned} x + 8y &= -18 \\ -6x + 3y &= 6 \end{aligned}$$

$$\begin{aligned} -6(-8y - 18) + 3y &= 6 \\ 48y + 108 + 3y &= 6 \\ 51y + 108 &= 6 \\ 51y &= -102 \\ y &= -2 \end{aligned}$$

$$\begin{aligned} x + 8y &= -18 \\ x + 8(-2) &= -18 \\ x &= -2 \end{aligned}$$

$(-2, -2)$

$$4. \begin{aligned} 9x + 3y &= -4 \\ y &= -8 - 3x \end{aligned}$$

$$\begin{aligned} 9x + 3(-8 - 3x) &= -4 \\ 9x - 24 - 9x &= -4 \\ -24 &= -4 \end{aligned}$$

No Solution

$$5. \begin{aligned} y &= x + 2 \\ y + 6 &= 3x \end{aligned}$$

$$\begin{aligned} x + 2 + 6 &= 3x \\ 8 &= 2x \\ 4 &= x \end{aligned}$$

$$\begin{aligned} y &= x + 2 \\ y &= 4 + 2 \\ y &= 6 \end{aligned}$$

$(4, 6)$

$$6. \begin{aligned} x &= 12.5 + 2y \\ 3x + 6y &= -47.7 \end{aligned}$$

$$\begin{aligned} 3(12.5 + 2y) + 6y &= -47.7 \\ 37.5 + 6y + 6y &= -47.7 \\ 12y &= -85.2 \\ y &= -7.1 \end{aligned}$$

$$\begin{aligned} x &= 12.5 + 2(-7.1) \\ x &= -1.7 \end{aligned}$$

$(-1.7, -7.1)$

Solve the following systems of linear equations using elimination:

$$7. \begin{aligned} -7x + 2y &= 4 \\ 7x - y &= -2 \end{aligned}$$

$$\begin{aligned} y &= 2 \\ 7x - 2 &= -2 \\ 7x &= 0 \\ x &= 0 \end{aligned}$$

$(0, 2)$

$$8. \begin{aligned} 4x &= 24 + 2y \\ -4x - 4y &= -12 \\ 4x - 2y &= 24 \\ -6y &= 12 \\ y &= -2 \end{aligned}$$

$$\begin{aligned} 4x &= 24 + 2y \\ 4x &= 24 + 2(-2) \\ 4x &= 20 \\ x &= 5 \end{aligned}$$

$(5, -2)$

$$\begin{aligned} 2x - 8y &= 8 \\ -2x + 8y &= 2 \end{aligned}$$

$$0 = 10$$

NO Solution

$$10. \begin{aligned} 2x + 3y &= -6 \\ -2[x - 2y = -10] & \\ -2x + 4y &= 20 \\ 2x + 3y &= -6 \end{aligned}$$

$$\begin{aligned} x - 2y &= -10 \\ x - 2(-2) &= -10 \\ x - 4 &= -10 \\ x &= -6 \end{aligned}$$

$$\begin{aligned} 7y &= 14 \\ y &= 2 \end{aligned}$$

$(-6, 2)$

$$11. \begin{aligned} 2[x + y = 7] & \\ -2x - 2y &= -14 \\ 2x + 2y &= 14 \end{aligned}$$

$$0 = 0$$

$\text{Infinitely many Solutions}$

$$12. \begin{aligned} [8x + 4y = 8] & \\ 4x + 8y &= 6.4 \\ -16x - 8y &= -16 \\ -12x &= -9.6 \end{aligned}$$

$$\begin{aligned} 8x + 4y &= 8 \\ 8(0.8) + 4y &= 8 \\ y &= 0.4 \end{aligned}$$

$(0.8, 0.4)$

$$13. \begin{aligned} 4[5x - 6y = 18] & \\ 3[-8x + 8y = -24] & \\ 20x - 24y &= 72 \\ -24x + 24y &= -72 \\ -4x &= 0 \\ x &= 0 \end{aligned}$$

$$\begin{aligned} 5x - 6y &= 18 \\ 5(0) - 6y &= 18 \\ -6y &= 18 \\ y &= -3 \end{aligned}$$

$(0, -3)$

$$14. \begin{aligned} 7[2x + 7y = -16] & \\ 2[-7x + 5y = -3] & \\ -14x + 10y &= -6 \\ 14x + 49y &= -112 \\ 59y &= -118 \\ y &= -2 \end{aligned}$$

$$\begin{aligned} 2x + 7y &= -16 \\ 2x + 7(-2) &= -16 \\ 2x &= -2 \\ x &= -1 \end{aligned}$$

$(-1, -2)$

Choose the best method for solving:

$$15. \begin{aligned} 2y &= 10 + x \Rightarrow x = 2y - 10 \\ 7x &= 4y \end{aligned}$$

$$\begin{aligned} 7(2y - 10) &= 4y \\ 14y - 70 &= 4y \\ y &= 7 \end{aligned}$$

$$\begin{aligned} 7x &= 4y \\ 7(x) &= 4(7) \\ x &= 4 \end{aligned}$$

$(4, 7)$

$$16. \begin{aligned} 2[x + 2y = 11.4] & \\ -2x + 6y &= 18.5 \\ 2x + 4y &= 22.8 \\ 10y &= 41.3 \\ y &= 4.13 \end{aligned}$$

$$\begin{aligned} x + 2(4.13) &= 11.4 \\ x &= 3.14 \end{aligned}$$

$(3.14, 4.13)$