

Write the augmented matrix for the linear system.

1.
$$\begin{aligned} 7x - 4y &= -91 \\ -8x - 3y &= 51 \end{aligned}$$

$$\left[\begin{array}{cc|c} 7 & -4 & -91 \\ -8 & -3 & 51 \end{array} \right]$$

2.
$$\begin{aligned} -5x + 9y &= 37 \\ -3x - 6y &= -12 \end{aligned}$$

$$\left[\begin{array}{cc|c} -5 & 9 & 37 \\ -3 & -6 & -12 \end{array} \right]$$

3.
$$\begin{aligned} 2x - 1y &= 2 \\ 4x + 7y &= -32 \end{aligned}$$

$$\left[\begin{array}{cc|c} 2 & -1 & 2 \\ 4 & 7 & -32 \end{array} \right]$$

4.
$$\begin{aligned} -1x - 2y - 4z &= 15 \\ -6x + 3y + 8z &= -18 \\ 2x - 6y + 5z &= -123 \end{aligned}$$

$$\left[\begin{array}{ccc|c} -1 & -2 & -4 & 15 \\ -6 & 3 & 8 & -18 \\ 2 & -6 & 5 & -123 \end{array} \right]$$

5.
$$\begin{aligned} -3x + 5y - 2z &= -7 \\ -7x + 9y - 6z &= 5 \\ -4x - 8y + 1z &= 20 \end{aligned}$$

$$\left[\begin{array}{ccc|c} -3 & 5 & -2 & -7 \\ -7 & 9 & -6 & 5 \\ -4 & -8 & 1 & 20 \end{array} \right]$$

6.
$$\begin{aligned} 8x - 2y - 5z &= 33 \\ -4x + 7y - 9z &= 152 \\ -3x - 1y - 6z &= 62 \end{aligned}$$

$$\left[\begin{array}{ccc|c} 8 & -2 & -5 & 33 \\ -4 & 7 & -9 & 152 \\ -3 & -1 & -6 & 62 \end{array} \right]$$

Write the augmented matrix for the linear system and then solve.

7.
$$\begin{aligned} \cancel{9x + 1y} &= \cancel{38} \\ \cancel{-5x - 4y} &= \cancel{3} \\ x + 9y &= 38 \\ 4x + 5y &= -3 \end{aligned}$$

$$\left[\begin{array}{cc|c} 1 & 9 & 38 \\ 4 & 5 & -3 \end{array} \right] \xrightarrow{r_2 - 4r_1 = r_2} \left[\begin{array}{cc|c} 1 & 9 & 38 \\ 0 & -31 & -155 \end{array} \right]$$

$$\frac{1}{-31}r_2 \rightarrow r_2 \left[\begin{array}{cc|c} 1 & 9 & 38 \\ 0 & 1 & 5 \end{array} \right]$$

$$r_1 - 9r_2 \left[\begin{array}{cc|c} 1 & 0 & -7 \\ 0 & 1 & 5 \end{array} \right]$$

$$\boxed{(-7, 5)}$$

8.
$$\begin{aligned} \cancel{-2x - 1y} &= \cancel{-18} \\ \cancel{-7x + 3y} &= \cancel{-128} \\ 2x + y &= 18 \\ 7x - 3y &= 128 \end{aligned}$$

$$\left[\begin{array}{cc|c} 2 & 1 & 18 \\ 7 & -3 & 128 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 7 & -3 & 128 \\ 2 & 1 & 18 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 13 & 0 & 192 \\ 2 & 1 & 18 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 1 & 0 & 14 \\ 2 & 1 & 18 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 1 & 0 & 14 \\ 0 & 1 & -10 \end{array} \right]$$

$$\boxed{(14, -10)}$$

9.
$$\begin{aligned} \cancel{-2x - 5y} &= \cancel{-5} \\ \cancel{8x - 9y} &= \cancel{-67} \\ 2x + 5y &= 5 \\ 8x - 9y &= -67 \end{aligned}$$

$$\left[\begin{array}{cc|c} 2 & 5 & 5 \\ 8 & -9 & -67 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 2 & 5 & 5 \\ 0 & 1 & 3 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 2 & 0 & -10 \\ 0 & 1 & 3 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 1 & 0 & -5 \\ 0 & 1 & 3 \end{array} \right]$$

$$\boxed{(-5, 3)}$$

Write the augmented matrix for the linear system and then solve.

10. $7x + 4y = -110$
 $-9x + 5y = 40$

$$\left[\begin{array}{cc|c} 7 & 4 & -110 \\ -9 & 5 & 40 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 71 & 0 & -710 \\ -16 & 1 & 150 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 1 & 0 & -10 \\ -16 & 1 & 150 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 1 & 0 & -10 \\ 0 & 1 & -10 \end{array} \right]$$

$$(-10, -10)$$

11. $-4x - 8y = 80$
 $9x - 5y = 73$

$$\left[\begin{array}{cc|c} -4 & -8 & 80 \\ 9 & -5 & 73 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 1 & -21 & 233 \\ 9 & -5 & 73 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 1 & -21 & 233 \\ 0 & 184 & 2024 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 1 & -21 & 233 \\ 0 & 1 & -11 \end{array} \right]$$

$$\left[\begin{array}{cc|c} 1 & 0 & 2 \\ 0 & 1 & -11 \end{array} \right]$$

$$(2, -11)$$

12. $+1x + 3y + 5z = +10$
 $+7x + 1y + 2z = +15$
 $5x + 9y - 6z = 5$

$$\left[\begin{array}{ccc|c} 1 & -3 & 5 & 10 \\ 7 & 1 & 2 & 15 \\ 5 & 9 & -6 & 5 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & -3 & 5 & 10 \\ 0 & 22 & -33 & -55 \\ 5 & 9 & -6 & 5 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & -3 & 5 & 10 \\ 0 & 22 & -33 & -55 \\ 0 & 24 & -31 & -45 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & -3 & 5 & 10 \\ 0 & 2 & -3 & -5 \\ 0 & 24 & -31 & -45 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & -3 & 5 & 10 \\ 0 & 2 & -3 & -5 \\ 0 & 0 & 5 & 15 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & -3 & 5 & 10 \\ 0 & 2 & -3 & -5 \\ 0 & 0 & 1 & 3 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & -3 & 5 & 10 \\ 0 & 2 & -3 & -5 \\ 0 & 0 & 1 & 3 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & -3 & 5 & 10 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 3 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & 0 & 5 & 16 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 3 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 3 \end{array} \right]$$

$$(1, 2, 3)$$

Write the augmented matrix for the linear system and then solve using a graphing calculator.

13. $-6x + 7y = 162$
 $-3x - 1y = 27$

$$\left[\begin{array}{cc|c} -6 & 7 & 162 \\ -3 & -1 & 27 \end{array} \right]$$

$$(-13, 12)$$

14. $-4x - 1y - 2z = -47$
 $-3x + 8y + 7z = -72$
 $-5x + 8y - 2z = -157$

$$\left[\begin{array}{ccc|c} -4 & -1 & -2 & -47 \\ -3 & 8 & 7 & -72 \\ -5 & 8 & -2 & -157 \end{array} \right]$$

$$(11, -11, 7)$$

15. $1x + 9y - 7z = 39$
 $-6x + 4y - 3z = 74$
 $-2x + 7y - 6z = 62$

$$\left[\begin{array}{ccc|c} 1 & 9 & -7 & 39 \\ -6 & 4 & -3 & 74 \\ -2 & 7 & -6 & 62 \end{array} \right]$$

$$(-9, 4, -12)$$

16. $3x - 7y + 2z = 42$
 $-2x - 3y - 7z = 132$
 $-4x + 5y + 9z = -144$

$$\left[\begin{array}{ccc|c} 3 & -7 & 2 & 42 \\ -2 & -3 & -7 & 132 \\ -4 & 5 & 9 & -144 \end{array} \right]$$

$$(-6, -12, -12)$$

17. $8x + 1y - 6z = -35$
 $-9x + 7y - 8z = 164$
 $5x - 3y + 4z = -88$

$$\left[\begin{array}{ccc|c} 8 & 1 & -6 & -35 \\ -9 & 7 & -8 & 164 \\ 5 & -3 & 4 & -88 \end{array} \right]$$

$$(-11, -1, -9)$$

18. $1x - 6y - 4z = 70$
 $-8x + 3y - 1z = -95$
 $-2x + 5y - 6z = 21$

$$\left[\begin{array}{ccc|c} 1 & -6 & -4 & 70 \\ -8 & 3 & -1 & -95 \\ -2 & 5 & -6 & 21 \end{array} \right]$$

$$(12, -3, -10)$$