

3.4 EXERCISES

HOMEWORK KEY

 = **WORKED-OUT SOLUTIONS**
on p. WS1 for Exs. 11, 25, and 45

 = **TAKS PRACTICE AND REASONING**
Exs. 23, 24, 34, 45, 47, 49, and 50

SKILL PRACTICE

- VOCABULARY** Write a linear equation in three variables. What is the graph of such an equation?
- WRITING** Explain how to use the substitution method to solve a system of three linear equations in three variables.

EXAMPLES 1, 2, and 3

on pp. 179–180
for Exs. 3–14

CHECKING SOLUTIONS Tell whether the given ordered triple is a solution of the system.

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|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| 3. $(1, 4, -3)$
$2x - y + z = -5$
$5x + 2y - 2z = 19$
$x - 3y + z = -5$ | 4. $(-1, -2, 5)$
$4x - y + 3z = 13$
$x + y + z = 2$
$x + 3y - 2z = -17$ | 5. $(6, 0, -3)$
$x + 4y - 2z = 12$
$3x - y + 4z = 6$
$-x + 3y + z = -9$ |
| 6. $(-5, 1, 0)$
$3x + 4y - 2z = -11$
$2x + y - z = 11$
$x + 4y + 3z = -1$ | 7. $(2, 8, 4)$
$3x - y + 5z = 34$
$x + 3y - 6z = 2$
$-3x + y - 2z = -6$ | 8. $(0, -4, 7)$
$2x + 4y - z = -23$
$x - 5y - 3z = -1$
$-x + y + 4z = 24$ |

ELIMINATION METHOD Solve the system using the elimination method.

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|----------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------|
| 9. $3x + y + z = 14$
$-x + 2y - 3z = -9$
$5x - y + 5z = 30$ | 10. $2x - y + 2z = -7$
$-x + 2y - 4z = 5$
$x + 4y - 6z = -1$ | 11. $3x - y + 2z = 4$
$6x - 2y + 4z = -8$
$2x - y + 3z = 10$ |
| 12. $4x - y + 2z = -18$
$-x + 2y + z = 11$
$3x + 3y - 4z = 44$ | 13. $5x + y - z = 6$
$x + y + z = 2$
$3x + y = 4$ | 14. $2x + y - z = 9$
$-x + 6y + 2z = -17$
$5x + 7y + z = 4$ |

EXAMPLE 4

on p. 181
for Exs. 15–20

SUBSTITUTION METHOD Solve the system using the substitution method.

- | | | |
|-------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------|
| 15. $x + y - z = 4$
$3x + 2y + 4z = 17$
$-x + 5y + z = 8$ | 16. $2x - y - z = 15$
$4x + 5y + 2z = 10$
$-x - 4y + 3z = -20$ | 17. $4x + y + 5z = -40$
$-3x + 2y + 4z = 10$
$x - y - 2z = -2$ |
| 18. $x + 3y - z = 12$
$2x + 4y - 2z = 6$
$-x - 2y + z = -6$ | 19. $2x - y + z = -2$
$6x + 3y - 4z = 8$
$-3x + 2y + 3z = -6$ | 20. $3x + 5y - z = 12$
$x + y + z = 0$
$-x + 2y + 2z = -27$ |

ERROR ANALYSIS Describe and correct the error in the first step of solving the system.

$$\begin{aligned} 2x + y - 2z &= 23 \\ 3x + 2y + z &= 11 \\ x - y + z &= -2 \end{aligned}$$

21.

$$\begin{array}{r} 2x + y - 2z = 23 \\ 6x + 2y + 2z = 22 \\ \hline 8x + 3y = 45 \end{array}$$



22.

$$\begin{array}{r} z = 11 + 3x + 2y \\ 2x + y - 2(11 + 3x + 2y) = 23 \\ -4x - 3y = 45 \end{array}$$

