2.2 Using Matrices to Solve Systems of Equations

Student: _____

1. In the matrix of a system of linear equations, if one row of a matrix is a multiple of another row, then during the process of row reduction, one of those rows will eventually become all ones.

   True False

2. Your friend Frans tells you that the system of linear equations you are solving can have a unique solution even though the reduced matrix has a row of zeros. Is Frans' statement true or false?

   True False

3. Use Gauss-Jordan row reduction to solve the system.

$$\begin{aligned} 3x + y - 2z &= -8 \\ 2x - 3y + 2z &= 15 \\ x + y + z &= 5 \end{aligned}$$

   A. $(1, -1, 5)$

   B. $\left(0, 8, \frac{7}{9}\right)$

   C. $\left(8, \frac{7}{9}, -3\right)$

   D. $(5, 3, -3)$

   E. inconsistent

4. Use Gauss-Jordan row reduction to solve the system of equations.

$$\begin{aligned} 8x + 5y + z &= 6 \\ 8y + z &= 16 \end{aligned}$$

A. $(8, -3, 0)$

B. $(0, 1, 8)$

C. $(0, 0, 6)$

D. Redundant
E. Inconsistent

5. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{aligned} 3x - y &= 17 \\ 3x + 7y &= 25 \end{aligned}$$

A. $(6, 1)$

B. $(1, 6)$

C. $(1, 7)$

D. $(4, 1)$

E. $(7, 1)$

6. Use Gauss-Jordan row reduction to solve the system of equations.

$$\begin{aligned} 9x &- 2y = 37 \\ -x &+ 7y = 23 \end{aligned}$$

A. $(4,5)$

B. $(7,4)$

C. $(5,1)$

D. $(5,4)$

E. $(4,4)$

7. Use Gauss-Jordan row reduction to solve the system of equations.

$$\begin{aligned} 7x &+ y = 11 \\ 7x &+ 3y = 9 \end{aligned}$$

A. $(\frac{12}{7},-1)$

B. $(\frac{7}{12},-1)$

C. $(\frac{7}{12},1)$

D. $(\frac{12}{7},1)$

E. $(\frac{7}{12},0)$

8. Use Gauss-Jordan reduction to solve the system of equations.

$$\begin{aligned} 2x - 3y &= 5 \\ 3x - 5y &= 5 \\ x - y &= 5 \end{aligned}$$

A. $(11, 15)$

B. $(10, 5)$

C. $(12, 15)$

D. $(11, 5)$

E. $(12, 5)$

9. Solve the system of equations using Gauss-Jordan row reduction.

$$\begin{aligned} 8x + 9z &= -4 \\ 4y + 4z &= -9 \\ \frac{16}{3}y + \frac{16}{3}z &= -4 \end{aligned}$$

A. $(8, 3, 0)$

B. $(8, 1, 3)$

C. $(-1, 0, -1)$

D. inconsistent
E. dependent

10. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{aligned} x + y + 5z &= 3 \\ y + 2z + w &= 2 \\ x + 3y + 7z + 2w &= 2 \\ x + y + 5z + w &= 2 \end{aligned}$$

A. $\left(-\frac{15}{2}, -3, \frac{5}{2}, -1\right)$

B. $\left(-\frac{15}{4}, -2, \frac{5}{2}, -1\right)$

C. $\left(-\frac{15}{2}, -2, \frac{5}{2}, -1\right)$

D. $\left(-\frac{15}{2}, -4, \frac{5}{4}, -1\right)$

E. $\left(-\frac{15}{2}, -2, \frac{5}{2}, 0\right)$

11. Use Gauss-Jordan row reduction to solve the given system of equations.

$$x - 2y + z - 4w = 2$$

$$x + 3y + 7z + 2w = 1$$

$$2x + y + 8z - 2w = 3$$

A. $\left(\frac{1}{5}(7 - 17z + 8w), \frac{1}{5}(-1 - 6z - 6w), z, w\right), z, w$ arbitrary

B. $\left(\frac{1}{5}(7 - 17z + 8w), \frac{1}{5}(-4 - 6z - 6w), z, w\right), z, w$ arbitrary

C. $\left(\frac{1}{5}(8 - 17z + 8w), \frac{12}{5}(-2 - 6z - 6w), z, w\right), z, w$ arbitrary

D. $\left(\frac{1}{5}(8 - 17z + 8w), \frac{1}{5}(-2 - 6z - 6w), z, w\right), z, w$ arbitrary

E. $\left(\frac{1}{5}(8 - 17z + 8w), \frac{1}{5}(-1 - 6z - 6w), z, w\right), z, w$ arbitrary

12. Solve the system of equations using Gauss-Jordan row reduction.

$$\begin{array}{rrrrrrr} x & +y & +z & +u & +v & = & 28 \\ & y & -z & +u & -v & = & -1 \\ & & z & +u & +v & = & 15 \\ & & & u & -v & = & -2 \\ & & & & v & = & 7 \end{array}$$

A. $(13, 0, 3, 5, 7)$

B. $(-4, 32, 17, -9, 7)$

C. $(9, 4, 3, 5, 7)$

D. inconsistent
E. dependent

13. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{array}{rrrrrrr} x & +y & +z & +u & +v & = & 15 \\ & y & +z & +u & +v & = & 2 \\ x & +2y & +2z & +2u & +2v & = & 17 \\ x & -y & -z & -u & -v & = & 11 \\ x & -2y & -2z & -2u & -2v & = & 9 \end{array}$$

A. $(16, 3 - z - u - v, z, u, v)$, z, u, v arbitrary

B. $(12, 2 - z - u - v, z, u, v)$, z, u, v arbitrary

C. $(13, 2 - z - u - v, z, u, v)$, z, u, v arbitrary

D. $(15, 3 - z - u - v, z, u, v)$, z, u, v arbitrary

E. $(17, 2 - z - u - v, z, u, v)$, z, u, v arbitrary

14. Use technology to solve the system of equations.

$$\begin{array}{rrrrcr} 4x & -2y & +z & +v & = & 130 \\ & 3y & +3z & -4v & = & 13 \\ 2x & +4y & & -v & = & 26 \\ x & +3y & +3z & & = & 13 \end{array}$$

A. $\left(\frac{6,968}{245}, -\frac{2,327}{245}, \frac{1,066}{245}, -\frac{1,742}{245}\right)$

B. $\left(\frac{536}{295}, -\frac{179}{295}, \frac{82}{295}, -\frac{134}{295}\right)$

C. $\left(\frac{6,968}{295}, -\frac{2,327}{295}, \frac{1,066}{295}, -\frac{1,742}{295}\right)$

D. $\left(\frac{6,868}{245}, -\frac{2,427}{245}, \frac{966}{245}, -\frac{1,642}{245}\right)$

E. $\left(\frac{536}{245}, -\frac{179}{245}, \frac{82}{245}, -\frac{134}{245}\right)$

15. Use technology to solve the system of equations. Express all solutions as decimals, rounded to one decimal place.

$$\begin{aligned} 1.6x &+ 2.4y - 3.2z = 17.6 \\ 5.1x &- 6.3y + 0.6z = -12.8 \\ 4.2x &+ 3.5y + 4.9z = 40.4 \end{aligned}$$

A. $(4.2, 5.5, 0.7)$

B. $(5.2, 5.5, -0.7)$

C. $(3.2, 11.0, -0.7)$

D. $(5.2, 5.5, 0.7)$

E. $(5.2, 11.0, -0.7)$

16. Use Gauss-Jordan row reduction to solve the given systems of equation.

$$\begin{aligned} x &- \frac{1}{2}y = 3 \\ \frac{1}{3}x &+ \frac{1}{3}y + \frac{1}{3}z = 5 \\ \frac{1}{2}x &- \frac{1}{2}z = -0.5 \end{aligned}$$

A. $(5,4,6)$

B. $(6,5,4)$

C. $(4,4,5)$

D. inconsistent
E. dependent

17. Use Gauss-Jordan row reduction to solve the given systems of equation.

$$\begin{aligned} 0.5x &+ 0.1y &&= 0.9 \\ 0.1x &- 0.1y &&= -0.1 \\ x &+ y &&= \frac{11}{3} \end{aligned}$$

A. $\left(\frac{4}{3}, \frac{7}{3}\right)$

B. $\left(\frac{8}{3}, \frac{14}{3}\right)$

C. $\left(\frac{8}{3}, \frac{7}{3}\right)$

D. inconsistent
E. dependent

18. Use Gauss-Jordan row reduction to solve the given system of equations.

$$3x - y - z = 8$$

$$x + y + z = 4$$

A. $(1, 3, 0)$

B. $(3, 1 - z, z)$

C. $(1 - z, 3, z)$

D. $(3, 2 - z, z)$

E. inconsistent

19. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{array}{rrrrrcr} x & -y & +z & -u & +v & = & 0 \\ & y & -z & +u & -v & = & -2 \\ x & & & & -2v & = & -10 \\ 2x & -y & +z & -u & -3v & = & -18 \\ 4x & -y & +z & -u & -7v & = & -38 \end{array}$$

A. $(-2, -1 + z - u, z, u, 5), z, u$ arbitrary

B. $(4, 2 + z - u, z, u, -2), z, u$ arbitrary

C. $(-1, 2 + z - u, z, u, -2), z, u$ arbitrary

D. $(-2, 2 + z - u, z, u, 4), z, u$ arbitrary

E. $(2, -4 + z - u, z, u, 5), z, u$ arbitrary

20. Use Gauss-Jordan row reduction to solve the system of equations.

$$\begin{array}{rcrcr} 6x & - & 9y & = & -24 \\ -x & + & 3y & = & 13 \end{array}$$

21. Use Gauss-Jordan row reduction to solve the system of equations.

$$\begin{aligned} 2x &- y = 20 \\ 2x &+ 6y = 13 \end{aligned}$$

22. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{aligned} 2x &- y = 3 \\ 2x &+ 7y = 11 \end{aligned}$$

23. Use Gauss-Jordan reduction to solve the system of equations.

$$\begin{aligned} 2x - 3y &= 9 \\ 3x - 5y &= 9 \\ x - y &= 9 \end{aligned}$$

24. Use Gauss-Jordan reduction to solve the system of equations.

$$\begin{aligned} -x - y + z &= 1 \\ 8y - 4z &= 0 \\ z &= 8 \end{aligned}$$

If the system is dependent or inconsistent, indicate this.

25. Use Gauss-Jordan reduction to solve the system of equations.

$$\begin{aligned} 5x \qquad &+ 5z &&= -8 \\ 7y \quad &+ 4z &&= -6 \\ \frac{14}{3}y \quad &+ \frac{8}{3}z &&= -2 \end{aligned}$$

If the system is dependent or inconsistent, indicate this.

26. Use Gauss-Jordan row reduction to solve the system of equations.

$$\begin{aligned} 9x + 3y - 5 &= 0 \\ 4x + 4y + 5 &= 0 \end{aligned}$$

27. Use Gauss-Jordan row reduction to solve the given system of equations.

$$3x - y - z = 4$$

$$x + y + z = 16$$

28. Use Gauss-Jordan row reduction to solve the given system of equations.

$$x + y + 5z = 1$$

$$y + 2z + w = 1$$

$$x + 3y + 7z + 2w = 2$$

$$x + y + 5z + w = 1$$

29. Use Gauss-Jordan row reduction to solve the given system of equations.

$$x - 2y + z - 4w = 3$$

$$x + 3y + 7z + 2w = 2$$

$$2x + y + 8z - 2w = 5$$

30. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{aligned} x - y + z - u + v &= 0 \\ y - z + u - v &= -10 \\ x - 2v &= -8 \\ 2x - y + z - u - 3v &= -6 \\ 4x - y + z - u - 7v &= -22 \end{aligned}$$

31. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{array}{rrrrrcr} x & +y & +z & +u & +v & = & 12 \\ & y & +z & +u & +v & = & 1 \\ x & +2y & +2z & +2u & +2v & = & 13 \\ x & -y & -z & -u & -v & = & 10 \\ x & -2y & -2z & -2u & -2v & = & 9 \end{array}$$

32. Use technology to solve the system of equations. Express all solutions as fractions.

$$\begin{array}{rrrrcr} 4x & -2y & +z & +v & = & 90 \\ & 3y & +3z & -4v & = & 9 \\ 2x & +4y & & -v & = & 18 \\ x & +3y & +3z & & = & 9 \end{array}$$

33. Use technology to solve the system of equations. Express all solutions as decimals, rounded to one decimal place.

$$\begin{aligned} 1.6x + 2.4y - 3.2z &= 26.4 \\ 5.1x - 6.3y + 0.6z &= -19.2 \\ 4.2x + 3.5y + 4.9z &= 60.6 \end{aligned}$$

34. Use Gauss-Jordan row reduction to solve the system.

$$\begin{aligned} 3x + y - 2z &= -1 \\ 2x - 3y + 2z &= 13 \\ x + y + z &= 4 \end{aligned}$$

35. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{aligned} 0.5x &+ 0.1y &&= 1.7 \\ 0.1x &- 0.1y &&= 0.3 \\ x &+ y &&= \frac{11}{3} \end{aligned}$$

36. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{aligned} x &- \frac{1}{2}y &&&&= 6 \\ \frac{1}{3}x &+ \frac{1}{3}y &+ \frac{1}{3}z &&&= 5 \\ \frac{1}{2}x &&- \frac{1}{2}z &&&= 0.5 \end{aligned}$$

2.2 Using Matrices to Solve Systems of Equations Key

1. In the matrix of a system of linear equations, if one row of a matrix is a multiple of another row, then during the process of row reduction, one of those rows will eventually become all ones.

   FALSE

2. Your friend Frans tells you that the system of linear equations you are solving can have a unique solution even though the reduced matrix has a row of zeros. Is Frans' statement true or false?

   FALSE

3. Use Gauss-Jordan row reduction to solve the system.

$$\begin{aligned} 3x + y - 2z &= -8 \\ 2x - 3y + 2z &= 15 \\ x + y + z &= 5 \end{aligned}$$

A. $(1, -1, 5)$

B. $\left(0, 8, \frac{7}{9}\right)$

C. $\left(8, \frac{7}{9}, -3\right)$

D. $(5, 3, -3)$

E. inconsistent

4. Use Gauss-Jordan row reduction to solve the system of equations.

$$\begin{aligned} 8x + 5y + z &= 6 \\ 8y + z &= 16 \end{aligned}$$

A. $(8, -3, 0)$

B. $(0, 1, 8)$

C. $(0, 0, 6)$

D. Redundant

E. Inconsistent

5. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{aligned} 3x - y &= 17 \\ 3x + 7y &= 25 \end{aligned}$$

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B. $(1, 6)$

C. $(1, 7)$

D. $(4, 1)$

E. $(7, 1)$

6. Use Gauss-Jordan row reduction to solve the system of equations.

$$\begin{aligned} 9x &- 2y = 37 \\ -x &+ 7y = 23 \end{aligned}$$

A. $(4,5)$

B. $(7,4)$

C. $(5,1)$

D. $(5,4)$

E. $(4,4)$

7. Use Gauss-Jordan row reduction to solve the system of equations.

$$\begin{aligned} 7x &+ y = 11 \\ 7x &+ 3y = 9 \end{aligned}$$

A. $(\frac{12}{7},-1)$

B. $(\frac{7}{12},-1)$

C. $(\frac{7}{12},1)$

D. $(\frac{12}{7},1)$

E. $(\frac{7}{12},0)$

8. Use Gauss-Jordan reduction to solve the system of equations.

$$\begin{aligned} 2x - 3y &= 5 \\ 3x - 5y &= 5 \\ x - y &= 5 \end{aligned}$$

A. $(11, 15)$

B. $(10, 5)$

C. $(12, 15)$

D. $(11, 5)$

E. $(12, 5)$

9. Solve the system of equations using Gauss-Jordan row reduction.

$$\begin{aligned} 8x + 9z &= -4 \\ 4y + 4z &= -9 \\ \frac{16}{3}y + \frac{16}{3}z &= -4 \end{aligned}$$

A. $(8, 3, 0)$

B. $(8, 1, 3)$

C. $(-1, 0, -1)$

D. inconsistent

E. dependent

10. Use Gauss-Jordan row reduction to solve the given system of equations.

$$x + y + 5z = 3$$

$$y + 2z + w = 2$$

$$x + 3y + 7z + 2w = 2$$

$$x + y + 5z + w = 2$$

A. $\left(-\frac{15}{2}, -3, \frac{5}{2}, -1\right)$

B. $\left(-\frac{15}{4}, -2, \frac{5}{2}, -1\right)$

C. $\left(-\frac{15}{2}, -2, \frac{5}{2}, -1\right)$

D. $\left(-\frac{15}{2}, -4, \frac{5}{4}, -1\right)$

E. $\left(-\frac{15}{2}, -2, \frac{5}{2}, 0\right)$

11. Use Gauss-Jordan row reduction to solve the given system of equations.

$$x - 2y + z - 4w = 2$$

$$x + 3y + 7z + 2w = 1$$

$$2x + y + 8z - 2w = 3$$

A. $\left(\frac{1}{5}(7 - 17z + 8w), \frac{1}{5}(-1 - 6z - 6w), z, w\right), z, w$ arbitrary

B. $\left(\frac{1}{5}(7 - 17z + 8w), \frac{1}{5}(-4 - 6z - 6w), z, w\right), z, w$ arbitrary

C. $\left(\frac{1}{5}(8 - 17z + 8w), \frac{12}{5}(-2 - 6z - 6w), z, w\right), z, w$ arbitrary

D. $\left(\frac{1}{5}(8 - 17z + 8w), \frac{1}{5}(-2 - 6z - 6w), z, w\right), z, w$ arbitrary

E. $\left(\frac{1}{5}(8 - 17z + 8w), \frac{1}{5}(-1 - 6z - 6w), z, w\right), z, w$ arbitrary

12. Solve the system of equations using Gauss-Jordan row reduction.

$$\begin{array}{rrrrrcr} x & +y & +z & +u & +v & = & 28 \\ & y & -z & +u & -v & = & -1 \\ & & z & +u & +v & = & 15 \\ & & & u & -v & = & -2 \\ & & & & v & = & 7 \end{array}$$

A. $(13, 0, 3, 5, 7)$

B. $(-4, 32, 17, -9, 7)$

C. $(9, 4, 3, 5, 7)$

D. inconsistent
E. dependent

13. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{array}{rrrrrcr} x & +y & +z & +u & +v & = & 15 \\ & y & +z & +u & +v & = & 2 \\ x & +2y & +2z & +2u & +2v & = & 17 \\ x & -y & -z & -u & -v & = & 11 \\ x & -2y & -2z & -2u & -2v & = & 9 \end{array}$$

A. $(16, 3 - z - u - v, z, u, v)$, z, u, v arbitrary

B. $(12, 2 - z - u - v, z, u, v)$, z, u, v arbitrary

C. $(13, 2 - z - u - v, z, u, v)$, z, u, v arbitrary

D. $(15, 3 - z - u - v, z, u, v)$, z, u, v arbitrary

E. $(17, 2 - z - u - v, z, u, v)$, z, u, v arbitrary

14. Use technology to solve the system of equations.

$$\begin{array}{rrrrcr} 4x & -2y & +z & +v & = & 130 \\ & 3y & +3z & -4v & = & 13 \\ 2x & +4y & & -v & = & 26 \\ x & +3y & +3z & & = & 13 \end{array}$$

A. $\left(\frac{6{,}968}{245}, -\frac{2{,}327}{245}, \frac{1{,}066}{245}, -\frac{1{,}742}{245}\right)$

B. $\left(\frac{536}{295}, -\frac{179}{295}, \frac{82}{295}, -\frac{134}{295}\right)$

C. $\left(\frac{6{,}968}{295}, -\frac{2{,}327}{295}, \frac{1{,}066}{295}, -\frac{1{,}742}{295}\right)$

D. $\left(\frac{6{,}868}{245}, -\frac{2{,}427}{245}, \frac{966}{245}, -\frac{1{,}642}{245}\right)$

E. $\left(\frac{536}{245}, -\frac{179}{245}, \frac{82}{245}, -\frac{134}{245}\right)$

15. Use technology to solve the system of equations. Express all solutions as decimals, rounded to one decimal place.

$$\begin{aligned} 1.6x + 2.4y - 3.2z &= 17.6 \\ 5.1x - 6.3y + 0.6z &= -12.8 \\ 4.2x + 3.5y + 4.9z &= 40.4 \end{aligned}$$

A. $(4.2, 5.5, 0.7)$

B. $(5.2, 5.5, -0.7)$

C. $(3.2, 11.0, -0.7)$

D. $(5.2, 5.5, 0.7)$

E. $(5.2, 11.0, -0.7)$

16. Use Gauss-Jordan row reduction to solve the given systems of equation.

$$\begin{aligned} x - \frac{1}{2}y &= 3 \\ \frac{1}{3}x + \frac{1}{3}y + \frac{1}{3}z &= 5 \\ \frac{1}{2}x - \frac{1}{2}z &= -0.5 \end{aligned}$$

A. $(5, 4, 6)$

B. $(6, 5, 4)$

C. $(4, 4, 5)$

D. inconsistent

E. dependent

17. Use Gauss-Jordan row reduction to solve the given systems of equation.

$$\begin{aligned} 0.5x + 0.1y &= 0.9 \\ 0.1x - 0.1y &= -0.1 \\ x + y &= \frac{11}{3} \end{aligned}$$

A. $\left(\frac{4}{3}, \frac{7}{3}\right)$

B. $\left(\frac{8}{3}, \frac{14}{3}\right)$

C. $\left(\frac{8}{3}, \frac{7}{3}\right)$

D. inconsistent
E. dependent

18. Use Gauss-Jordan row reduction to solve the given system of equations.

$$3x - y - z = 8$$

$$x + y + z = 4$$

A. $(1, 3, 0)$

B. $(3, 1 - z, z)$

C. $(1 - z, 3, z)$

D. $(3, 2 - z, z)$

E. inconsistent

19. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{array}{rrrrrcr} x & -y & +z & -u & +v & = & 0 \\ & y & -z & +u & -v & = & -2 \\ x & & & & -2v & = & -10 \\ 2x & -y & +z & -u & -3v & = & -18 \\ 4x & -y & +z & -u & -7v & = & -38 \end{array}$$

A. $(-2, -1 + z - u, z, u, 5), z, u$ arbitrary

B. $(4, 2 + z - u, z, u, -2), z, u$ arbitrary

C. $(-1, 2 + z - u, z, u, -2), z, u$ arbitrary

D. $(-2, 2 + z - u, z, u, 4), z, u$ arbitrary

E. $(2, -4 + z - u, z, u, 5), z, u$ arbitrary

20. Use Gauss-Jordan row reduction to solve the system of equations.

$$\begin{array}{rcrcr} 6x & - & 9y & = & -24 \\ -x & + & 3y & = & 13 \end{array}$$

$(5,6)$

21. Use Gauss-Jordan row reduction to solve the system of equations.

$$\begin{aligned} 2x &- y &&= 20 \\ 2x &+ 6y &&= 13 \end{aligned}$$

$$\left(\frac{19}{2}, -1\right)$$

22. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{aligned} 2x &- y &&= 3 \\ 2x &+ 7y &&= 11 \end{aligned}$$

$$(2,1)$$

23. Use Gauss-Jordan reduction to solve the system of equations.

$$\begin{aligned} 2x &- 3y &&= 9 \\ 3x &- 5y &&= 9 \\ x &- y &&= 9 \end{aligned}$$

$$(18,9)$$

24. Use Gauss-Jordan reduction to solve the system of equations.

$$\begin{aligned} -x \quad -y \quad +z &= 1 \\ 8y \quad -4z &= 0 \\ z &= 8 \end{aligned}$$

If the system is dependent or inconsistent, indicate this.

$(3,4,8)$

25. Use Gauss-Jordan reduction to solve the system of equations.

$$\begin{aligned} 5x \quad +5z &= -8 \\ 7y \quad +4z &= -6 \\ \frac{14}{3}y \quad +\frac{8}{3}z &= -2 \end{aligned}$$

If the system is dependent or inconsistent, indicate this.

inconsistent

26. Use Gauss-Jordan row reduction to solve the system of equations.

$$\begin{aligned} 9x + 3y - 5 &= 0 \\ 4x + 4y + 5 &= 0 \end{aligned}$$

$\left(\frac{35}{24}, -\frac{65}{24}\right)$

27. Use Gauss-Jordan row reduction to solve the given system of equations.

$$3x - y - z = 4$$

$$x + y + z = 16$$

$$(5, 11 - z, z)$$

28. Use Gauss-Jordan row reduction to solve the given system of equations.

$$x + y + 5z = 1$$

$$y + 2z + w = 1$$

$$x + 3y + 7z + 2w = 2$$

$$x + y + 5z + w = 1$$

$$\left(\frac{-3}{2}, 0, \frac{1}{2}, 0\right)$$

29. Use Gauss-Jordan row reduction to solve the given system of equations.

$$x - 2y + z - 4w = 3$$

$$x + 3y + 7z + 2w = 2$$

$$2x + y + 8z - 2w = 5$$

$$\left(\frac{1}{5}\cdot(-17z+8w+13), \frac{1}{5}\cdot(-6z-6w+-1), z, w\right)$$

30. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{array}{rrrrrcr} x & -y & +z & -u & +v & = & 0 \\ & y & -z & +u & -v & = & -10 \\ x & & & & -2v & = & -8 \\ 2x & -y & +z & -u & -3v & = & -6 \\ 4x & -y & +z & -u & -7v & = & -22 \end{array}$$

$$\left(-10,-11+z-u,z,u,-1\right)$$

31. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{array}{rrrrrcr} x & +y & +z & +u & +v & = & 12 \\ & y & +z & +u & +v & = & 1 \\ x & +2y & +2z & +2u & +2v & = & 13 \\ x & -y & -z & -u & -v & = & 10 \\ x & -2y & -2z & -2u & -2v & = & 9 \end{array}$$

$$(11,1-z-u-v,z,u,v)$$

32. Use technology to solve the system of equations. Express all solutions as fractions.

$$\begin{array}{rrrrcr} 4x & -2y & +z & +v & = & 90 \\ & 3y & +3z & -4v & = & 9 \\ 2x & +4y & & -v & = & 18 \\ x & +3y & +3z & & = & 9 \end{array}$$

$$\left(\frac{4,824}{245}, -\frac{1,611}{245}, \frac{738}{245}, -\frac{1,206}{245}\right)$$

33. Use technology to solve the system of equations. Express all solutions as decimals, rounded to one decimal place.

$$\begin{aligned} 1.6x + 2.4y - 3.2z &= 26.4 \\ 5.1x - 6.3y + 0.6z &= -19.2 \\ 4.2x + 3.5y + 4.9z &= 60.6 \end{aligned}$$

$(6.3, 8.2, 1.1)$

34. Use Gauss-Jordan row reduction to solve the system.

$$\begin{aligned} 3x + y - 2z &= -1 \\ 2x - 3y + 2z &= 13 \\ x + y + z &= 4 \end{aligned}$$

$(2, -1, 3)$

35. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{aligned} 0.5x + 0.1y &= 1.7 \\ 0.1x - 0.1y &= 0.3 \\ x + y &= \frac{11}{3} \end{aligned}$$

$\left(\frac{10}{3}, \frac{1}{3}\right)$

36. Use Gauss-Jordan row reduction to solve the given system of equations.

$$\begin{aligned} x - \frac{1}{2}y &= 6 \\ \frac{1}{3}x + \frac{1}{3}y + \frac{1}{3}z &= 5 \\ \frac{1}{2}x - \frac{1}{2}z &= 0.5 \end{aligned}$$

$(7,2,6)$