

1. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps.1-4/2.2.17.pg

Find an equation involving vectors that corresponds to the given linear system.

$$9x_1 - 6x_2 - 7x_3 = 9$$

$$7x_1 + 6x_2 + 9x_3 = -2$$

$$\begin{bmatrix} _ \\ _ \end{bmatrix} x_1 + \begin{bmatrix} _ \\ _ \end{bmatrix} x_2 + \begin{bmatrix} _ \\ _ \end{bmatrix} x_3 = \begin{bmatrix} _ \\ _ \end{bmatrix}$$

Solution: (Instructor solution preview: show the student solution after due date.)

SOLUTION

$$x_1 \begin{bmatrix} 9 \\ 7 \end{bmatrix} + x_2 \begin{bmatrix} -6 \\ 6 \end{bmatrix} + x_3 \begin{bmatrix} -7 \\ 9 \end{bmatrix} = \begin{bmatrix} 9 \\ -2 \end{bmatrix}$$

Correct Answers:

- 9
- 7
- -6
- 6
- -7
- 9
- 9
- -2

2. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps.1-4/2.1.7.pg

Express the following vector equation as a system of linear equations.

$$x_1 \begin{bmatrix} 1 \\ -4 \end{bmatrix} + x_2 \begin{bmatrix} -6 \\ 1 \end{bmatrix} = \begin{bmatrix} 4 \\ -1 \end{bmatrix}$$

(Keep the equations in order.)

$$_ x_1 + _ x_2 = _.$$

$$_ x_1 + _ x_2 = _.$$

Solution: (Instructor solution preview: show the student solution after due date.)

SOLUTION

$$1x_1 - 6x_2 = 4$$

$$-4x_1 + 1x_2 = -1$$

Correct Answers:

- 1
- -6
- 4
- -4

- 1
- -1

3. (1 pt) Library/Rochester/setLinearAlgebra3Matrices/ur_Ja.3.15.pg
Find a and b such that

$$\begin{bmatrix} 13 \\ 16 \\ 9 \end{bmatrix} = a \begin{bmatrix} 1 \\ 4 \\ 2 \end{bmatrix} + b \begin{bmatrix} 10 \\ 4 \\ 3 \end{bmatrix}.$$

$$a = _$$

$$b = _$$

Correct Answers:

- 3
- 1

4. (1 pt) Library/Rochester/setLinearAlgebra3Matrices/ur_Ja.3.15.pg
Find a and b such that

$$\begin{bmatrix} -23 \\ 2 \\ -8 \end{bmatrix} = a \begin{bmatrix} 1 \\ 2 \\ -2 \end{bmatrix} + b \begin{bmatrix} 6 \\ -4 \\ 6 \end{bmatrix}.$$

$$a = _$$

$$b = _$$

Correct Answers:

- -5
- -3

5. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps.1-4/2.1.23.pg

Solve for the unknowns in the vector equation below.

$$3 \begin{bmatrix} a \\ -9 \end{bmatrix} - 9 \begin{bmatrix} -4 \\ b \end{bmatrix} = \begin{bmatrix} -8 \\ 7 \end{bmatrix}$$

$$a = _$$

$$b = _$$

Solution: (Instructor solution preview: show the student solution after due date.)

SOLUTION

$$a = (-8 + 9 * -4) / 3 = -14.66666666666667$$

$$b = (7 - 3 * -9) / -9 = -3.77777777777778$$

Correct Answers:

- -14.66666666666667
- -3.77777777777778

6. (1 pt) Library/Rochester/setLinearAlgebra3Matrices/ur_la.3.15.pg
Find a and b such that

$$\begin{bmatrix} -14 \\ 4 \\ 0 \end{bmatrix} = a \begin{bmatrix} 1 \\ 4 \\ 3 \end{bmatrix} + b \begin{bmatrix} 4 \\ -4 \\ -2 \end{bmatrix}.$$

$a =$ _____

$b =$ _____

Correct Answers:

- -2
- -3

7. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps.1-4/2.1.8.pg

Consider the following vector equation.

$$x_1 \begin{bmatrix} 4 \\ -7 \\ -2 \end{bmatrix} + x_2 \begin{bmatrix} 4 \\ 9 \\ 9 \end{bmatrix} = \begin{bmatrix} -1 \\ 3 \\ 6 \end{bmatrix}.$$

Express the vector equation as a system of linear equations.
(Order your equations from the top.)

The first equation is $___x_1 + ___x_2 = ___$.

The second equation is $___x_1 + ___x_2 = ___$.

The third equation is $___x_1 + ___x_2 = ___$.

Solution: (Instructor solution preview: show the student solution after due date.)

SOLUTION

Each row of the vector equation becomes a linear equation.

Correct Answers:

- 4
- 4
- -1
- -7
- 9
- 3
- -2
- 9
- 6

8. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps.1-4/2.1.12.pg

Express the following system of linear equations as a vector equation.

$$9x_1 + 1x_2 + 8x_3 = -4$$

$$0x_1 + 8x_2 - 9x_3 = -4$$

$$0x_1 + 2x_2 + 4x_3 = -9$$

$$\begin{bmatrix} ___ \\ ___ \\ ___ \end{bmatrix} x_1 + \begin{bmatrix} ___ \\ ___ \\ ___ \end{bmatrix} x_2 + \begin{bmatrix} ___ \\ ___ \\ ___ \end{bmatrix} x_3 = \begin{bmatrix} ___ \\ ___ \\ ___ \end{bmatrix}$$

Solution: (Instructor solution preview: show the student solution after due date.)

SOLUTION

$$\begin{bmatrix} 9 \\ 0 \\ 0 \end{bmatrix} x_1 + \begin{bmatrix} 1 \\ 8 \\ 2 \end{bmatrix} x_2 + \begin{bmatrix} 8 \\ -9 \\ 4 \end{bmatrix} x_3 = \begin{bmatrix} -4 \\ -4 \\ -9 \end{bmatrix}$$

Correct Answers:

- 9
- 0
- 0
- 1
- 8
- 2
- 8
- -9
- 4
- -4
- -4
- -9

9. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps.1-4/2.2.13.pg

Find A , and \mathbf{b} such that $A\mathbf{x} = \mathbf{b}$ corresponds to the given linear system.

$$3x_1 - 6x_2 - 8x_3 = -9$$

$$-1x_1 + 8x_2 + 7x_3 = -8$$

$$\begin{bmatrix} ___ & ___ & ___ \\ ___ & ___ & ___ \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} ___ \\ ___ \end{bmatrix}$$

Solution: (Instructor solution preview: show the student solution after due date.)

SOLUTION

$$\begin{bmatrix} 3 & -6 & -8 \\ -1 & 8 & 7 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} -9 \\ -8 \end{bmatrix}$$

Correct Answers:

- 3
- -6
- -8
- -1
- 8
- 7
- -9
- -8

10. (1 pt) Library/TCNJ/TCNJ_MatrixEquations/problem11.pg

The vector $\begin{bmatrix} -7 \\ -15 \\ -20 \end{bmatrix}$ is a linear combination of the vectors $\begin{bmatrix} -4 \\ 5 \\ -2 \end{bmatrix}$ and $\begin{bmatrix} 9 \\ -10 \\ 6 \end{bmatrix}$ if and only if the matrix equation $A\vec{x} = \vec{b}$ has a solution \vec{x} , where

$$A = \begin{bmatrix} _ & _ \\ _ & _ \\ _ & _ \end{bmatrix} \text{ and } \vec{b} = \begin{bmatrix} _ \\ _ \\ _ \end{bmatrix}.$$

Correct Answers:

- $\begin{bmatrix} -4 & 9 \\ 5 & -10 \\ -2 & 6 \end{bmatrix}$
- $\begin{bmatrix} -7 \\ -15 \\ -20 \end{bmatrix}$

11. (1 pt) local/Library/UI/LinearSystems/mforms.pg

Determine the following equivalent representations of the following system of equations:

$$3x + 6y = -6$$

$$-3x + 3y = -21$$

a. Find the augmented matrix of the system.

$$\left[\begin{array}{cc|c} _ & _ & _ \\ _ & _ & _ \end{array} \right]$$

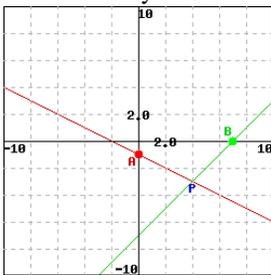
b. Find the matrix form of the system.

$$\begin{bmatrix} _ & _ \\ _ & _ \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} _ \\ _ \end{bmatrix}$$

c. Find matrices that satisfy the following matrix equation.

$$x \begin{bmatrix} _ \\ _ \end{bmatrix} + y \begin{bmatrix} _ \\ _ \end{bmatrix} = \begin{bmatrix} _ \\ _ \end{bmatrix}$$

d. The graph below shows the lines determined by the two equations in our system:



Find the coordinates of

$$P = (_, _)$$

Find the coordinates of y-intercept of the red line.

$$A = (0, _)$$

Find the coordinates of x-intercept of the green line.

$$B = (_, 0)$$

Correct Answers:

- $\begin{bmatrix} 3 & 6 & -6 \\ -3 & 3 & -21 \end{bmatrix}$
- $\begin{bmatrix} 3 & 6 \\ -3 & 3 \end{bmatrix}$
- $\begin{bmatrix} -6 \\ -21 \end{bmatrix}$
- $\begin{bmatrix} 3 \\ -3 \end{bmatrix}$
- $\begin{bmatrix} 6 \\ 3 \end{bmatrix}$
- $\begin{bmatrix} -6 \\ -21 \end{bmatrix}$
- 4
- -3
- -1
- 7

12. (1 pt) Library/TCNJ/TCNJ_MatrixEquations/problem12.pg

The vector $\begin{bmatrix} 19 \\ 16 \end{bmatrix}$ is a linear combination of the vectors $\begin{bmatrix} 4 \\ -1 \end{bmatrix}$ and $\begin{bmatrix} -9 \\ 8 \end{bmatrix}$ if and only if the matrix equation $A\vec{x} = \vec{b}$ has a solution \vec{x} , where

$$A = \begin{bmatrix} _ & _ \\ _ & _ \end{bmatrix} \text{ and } \vec{b} = \begin{bmatrix} _ \\ _ \end{bmatrix}.$$

Correct Answers:

- $\begin{bmatrix} 4 & -9 \\ -1 & 8 \end{bmatrix}$
- $\begin{bmatrix} 19 \\ 16 \end{bmatrix}$

13. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps.1-4/2.2.16.pg

Find A and \mathbf{b} such that $A\mathbf{x} = \mathbf{b}$ corresponds to the given linear system.

$$5x_1 + 4x_2 = -7$$

$$4x_1 + 4x_2 = -3$$

$$6x_1 + 3x_2 = 9$$

$$\begin{bmatrix} _ & _ \\ _ & _ \\ _ & _ \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} _ \\ _ \\ _ \end{bmatrix}$$

Solution: (Instructor solution preview: show the student solution after due date.)

SOLUTION

$$\begin{bmatrix} 5 & 4 \\ 4 & 4 \\ 6 & 3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -7 \\ -3 \\ 9 \end{bmatrix}$$

Correct Answers:

- 5
- 4
- 4
- 4
- 6
- 3
- -7
- -3
- 9

14. (1 pt) Library/TCNJ/TCNJ_VectorEquations/problem2.pg

Write a vector equation

$$\begin{bmatrix} _ \\ _ \\ _ \end{bmatrix} x + \begin{bmatrix} _ \\ _ \\ _ \end{bmatrix} y + \begin{bmatrix} _ \\ _ \\ _ \end{bmatrix} z = \begin{bmatrix} _ \\ _ \\ _ \end{bmatrix}$$

that is equivalent to the system of equations:

$$\begin{cases} x - 4y + z = -7, \\ -6x - 5y - 9z = 9, \\ 2x - 2y + 7z = 8. \end{cases}$$

Correct Answers:

- $\begin{bmatrix} 1 \\ -6 \\ 2 \end{bmatrix}$
- $\begin{bmatrix} -4 \\ -5 \\ -2 \end{bmatrix}$
- $\begin{bmatrix} 1 \\ -9 \\ 7 \end{bmatrix}$
- $\begin{bmatrix} -7 \\ 9 \\ 8 \end{bmatrix}$

15. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps.1-4/2.2.20.pg

Find an equation involving vectors the corresponds to the given linear system.

$$5x_1 + 5x_2 = -6$$

$$0x_1 + 6x_2 = -2$$

$$\begin{bmatrix} _ \\ _ \\ _ \end{bmatrix} x_1 + \begin{bmatrix} _ \\ _ \\ _ \end{bmatrix} x_2 = \begin{bmatrix} _ \\ _ \\ _ \end{bmatrix}$$

Solution: (Instructor solution preview: show the student solution after due date.)

SOLUTION

$$x_1 \begin{bmatrix} 5 \\ 0 \\ 1 \end{bmatrix} + x_2 \begin{bmatrix} 5 \\ 6 \\ 6 \end{bmatrix} = \begin{bmatrix} -6 \\ -2 \\ 4 \end{bmatrix}$$

Correct Answers:

- 5
- 0
- 1
- 5
- 6
- 6
- -6
- -2
- 4