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.

$$2x_1 + 1x_2 + 4x_3 = 8$$

$$9x_1 + 8x_2 + 5x_3 = 1$$

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

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

SOLUTION

$$x_1 \begin{bmatrix} 2 \\ 9 \end{bmatrix} + x_2 \begin{bmatrix} 1 \\ 8 \end{bmatrix} + x_3 \begin{bmatrix} 4 \\ 5 \end{bmatrix} = \begin{bmatrix} 8 \\ 1 \end{bmatrix}$$

Correct Answers:

- 2
- 9
- 1
- 8
- 4
- 5
- 8
- 1

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.

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

(Keep the equations in order.)

$\underline{} x_1 + \underline{} x_2 = \underline{}$.
$\underline{} x_1 + \underline{} x_2 = \underline{}$.

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

SOLUTION

$$4x_1 + 6x_2 = -9$$
$$7x_1 + 4x_2 = -6$$

Correct Answers:

- 4
- 6
- -9
- 7

- 4
- -6

3. (1 pt) Library/Rochester/setLinearAlgebra3Matrices/ur_la_3_15.pg

Find a and b such that

$$\begin{bmatrix} 30 \\ 2 \\ 4 \end{bmatrix} = a \begin{bmatrix} 1 \\ 1 \\ -2 \end{bmatrix} + b \begin{bmatrix} 8 \\ 1 \\ 0 \end{bmatrix}.$$

$a = \underline{}$
$b = \underline{}$

Correct Answers:

- -2
- 4

4. (1 pt) Library/Rochester/setLinearAlgebra3Matrices/ur_la_3_15.pg

Find a and b such that

$$\begin{bmatrix} -15 \\ -24 \\ -11 \end{bmatrix} = a \begin{bmatrix} 1 \\ 4 \\ 1 \end{bmatrix} + b \begin{bmatrix} 11 \\ 8 \\ 7 \end{bmatrix}.$$

$a = \underline{}$
$b = \underline{}$

Correct Answers:

- -4
- -1

5. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps_1-4-/2.1.23.pg

Solve for the unknowns in the vector equation below.

$$1 \begin{bmatrix} a \\ -9 \end{bmatrix} - 3 \begin{bmatrix} 8 \\ b \end{bmatrix} = \begin{bmatrix} -5 \\ -8 \end{bmatrix}$$

$a = \underline{}$
$b = \underline{}$

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

SOLUTION

$$a = (-5 + 3 * 8)/1 = 19$$

$$b = (-8 - 1 * -9)/-3 = -0.333333333333333$$

Correct Answers:

- 19
- -0.333333333333333

6. (1 pt) Library/Rochester/setLinearAlgebra3Matrices/ur_la_3_15.pg
Find a and b such that

$$\begin{bmatrix} 0 \\ 5 \\ 10 \end{bmatrix} = a \begin{bmatrix} 1 \\ -1 \\ -1 \end{bmatrix} + b \begin{bmatrix} 3 \\ 2 \\ 7 \end{bmatrix}.$$

$a = $ _____
$b = $ _____

Correct Answers:

- -3
- 1

7. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps_1-4/2.1.8.pg

Consider the following vector equation.

$$x_1 \begin{bmatrix} 1 \\ 7 \\ -4 \end{bmatrix} + x_2 \begin{bmatrix} -9 \\ 1 \\ 5 \end{bmatrix} = \begin{bmatrix} 0 \\ 8 \\ 6 \end{bmatrix}.$$

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:

- 1
- -9
- 0
- 7
- 1
- 8
- -4
- 5
- 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.

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

$$2x_1 + 5x_2 - 3x_3 = -6$$

$$5x_1 + 8x_2 + 1x_3 = -1$$

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

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

SOLUTION

$$\begin{bmatrix} 9 \\ 2 \\ 5 \end{bmatrix} x_1 + \begin{bmatrix} -9 \\ 5 \\ 8 \end{bmatrix} x_2 + \begin{bmatrix} -6 \\ -3 \\ 1 \end{bmatrix} x_3 = \begin{bmatrix} 3 \\ -6 \\ -1 \end{bmatrix}$$

Correct Answers:

- 9
- 2
- 5
- -9
- 5
- 8
- -6
- -3
- 1
- 3
- -6
- -1

9. (1 pt) Library/WHFreeman/Holt_linear_algebra/Chaps_1-4/2.2.13.pg

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

$$2x_1 + 1x_2 - 2x_3 = -9$$

$$8x_1 + 5x_2 + 0x_3 = 2$$

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

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

SOLUTION

$$\begin{bmatrix} 2 & 1 & -2 \\ 8 & 5 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} -9 \\ 2 \end{bmatrix}$$

Correct Answers:

- 2
- 1
- -2
- 8
- 5
- 0
- -9
- 2

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

The vector $\begin{bmatrix} 10 \\ -16 \\ 3 \end{bmatrix}$ is a linear combination of the vectors

$\begin{bmatrix} -4 \\ 3 \\ 2 \end{bmatrix}$ and $\begin{bmatrix} -6 \\ 8 \\ -8 \end{bmatrix}$ if and only if the matrix equation $A\vec{x} = \vec{b}$

has a solution $\vec{x}$, where

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

Correct Answers:

- $\begin{bmatrix} -4 & -6 \\ 3 & 8 \\ 2 & -8 \end{bmatrix}$

- $\begin{bmatrix} 10 \\ -16 \\ 3 \end{bmatrix}$

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

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

$$10x + 6y = 48$$

$$-8x + 8y = -64$$

a. Find the augmented matrix of the system.

$\begin{bmatrix} \underline{} & \underline{} & \underline{} \\ \underline{} & \underline{} & \underline{} \end{bmatrix}$

b. Find the matrix form of the system.

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

c. Find matrices that satisfy the following matrix equation.

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

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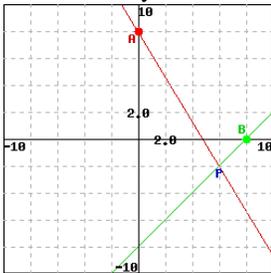
Find the coordinates of

$P = (\underline{}, \underline{})$

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

$A = (0, \underline{})$

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

$B = (\underline{}, 0)$

Correct Answers:

- $\begin{bmatrix} 10 & 6 & 48 \\ -8 & 8 & -64 \end{bmatrix}$

- $\begin{bmatrix} 10 & 6 \\ -8 & 8 \end{bmatrix}$

- $\begin{bmatrix} 48 \\ -64 \end{bmatrix}$

- $\begin{bmatrix} 10 \\ -8 \end{bmatrix}$

- $\begin{bmatrix} 6 \\ 8 \end{bmatrix}$

- $\begin{bmatrix} 48 \\ -64 \end{bmatrix}$

- 6
- -2
- 8
- 8

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

The vector $\begin{bmatrix} 4 \\ -19 \end{bmatrix}$ is a linear combination of the vectors

$\begin{bmatrix} -2 \\ -3 \end{bmatrix}$ and $\begin{bmatrix} 6 \\ -8 \end{bmatrix}$ if and only if the matrix equation $A\vec{x} = \vec{b}$

has a solution $\vec{x}$, where

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

Correct Answers:

- $\begin{bmatrix} -2 & 6 \\ -3 & -8 \end{bmatrix}$

- $\begin{bmatrix} 4 \\ -19 \end{bmatrix}$

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.

$$1x_1 - 5x_2 = -6$$

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

$$1x_1 - 2x_2 = 2$$

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

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

SOLUTION

$$\begin{bmatrix} 1 & -5 \\ -6 & 6 \\ 1 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -6 \\ 2 \\ 2 \end{bmatrix}$$

Correct Answers:

- 1
- -5
- -6
- 6
- 1
- -2
- -6
- 2
- 2

14. (1 pt) Library/TCNJ/TCNJ_VectorEquations/problem2.pg
Write a vector equation

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

that is equivalent to the system of equations:

$$\begin{cases} -7x - 3y - 8z &= -9, \\ -x - y + z &= 4, \\ y - 5x - 3z &= 5. \end{cases}$$

Correct Answers:

- $\begin{bmatrix} -7 \\ -1 \\ -5 \end{bmatrix}$

- $\begin{bmatrix} -3 \\ -1 \\ 1 \end{bmatrix}$

- $\begin{bmatrix} -8 \\ 1 \\ -3 \end{bmatrix}$

- $\begin{bmatrix} -9 \\ 4 \\ 5 \end{bmatrix}$

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.

$$1x_1 + 5x_2 = 9$$

$$-3x_1 + 8x_2 = -2$$

$$3x_1 + 4x_2 = 4$$

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

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

SOLUTION

$$x_1 \begin{bmatrix} 1 \\ -3 \\ 3 \end{bmatrix} + x_2 \begin{bmatrix} 5 \\ 8 \\ 4 \end{bmatrix} = \begin{bmatrix} 9 \\ -2 \\ 4 \end{bmatrix}$$

Correct Answers:

- 1
- -3
- 3
- 5
- 8
- 4
- 9
- -2
- 4