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.

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

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

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

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.)

__ $x_1 +$ __ $x_2 =$ __.

__ $x_1 +$ __ $x_2 =$ __.

3. **(1 pt) Library/Rochester/setLinearAlgebra3Matrices/ur_la_3_15.pg**
Find a and b such that

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

$a =$ _____

$b =$ _____

4. **(1 pt) Library/Rochester/setLinearAlgebra3Matrices/ur_la_3_15.pg**
Find a and b such that

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

$a =$ _____

$b =$ _____

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

Solve for the unknowns in the vector equation below.

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

$a =$_____

$b =$_____

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

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

$a =$ _____

$b =$ _____

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 __.

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.

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

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

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

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

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.

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

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

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

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

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

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.

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

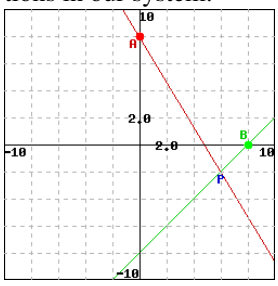
b. Find the matrix form of the system.

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

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.
$B = (\_\_, 0)$

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

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

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.

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

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

$$1x_1 - 2x_2 = 2$$

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

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:

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

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.

$$1x_1 + 5x_2 = 9$$

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

$$3x_1 + 4x_2 = 4$$

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