1. (1 point)
Let
$\mathbf{u} = \begin{bmatrix}9\\3\\1\end{bmatrix}, \mathbf{v} = \begin{bmatrix}5\\4\\0\end{bmatrix}, \mathbf{w} = \begin{bmatrix}0\\9\\5\end{bmatrix}$
Compute $8\mathbf{u} - 3\mathbf{v} - 4\mathbf{w} = \begin{bmatrix}\_\_\_\_\\\_\_\_\_\\\_\_\_\_\end{bmatrix}$
Answer(s) submitted:
- 57
- -24
- -12

(correct)

2. (1 point)
Express the following system of linear equations as a vector equation.

$$3x_1 + 5x_2 + 8x_3 = -9$$
$$5x_1 + 6x_2 + 2x_3 = -8$$
$$1x_1 - 8x_2 + 5x_3 = 9$$

$\begin{bmatrix}\_\_\\\_\_\\\_\_\end{bmatrix} x_1 + \begin{bmatrix}\_\_\\\_\_\\\_\_\end{bmatrix} x_2 + \begin{bmatrix}\_\_\\\_\_\\\_\_\end{bmatrix} x_3 = \begin{bmatrix}\_\_\\\_\_\\\_\_\end{bmatrix}$
Answer(s) submitted:
- 3
- 5
- 1
- 5
- 6
- -8
- 8
- 2
- 5
- -9
- -8
- 9

(correct)

3. (1 point)
Express the following vector equation as a system of linear equations.

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

(Keep the equations in order.)
$\_\_ x_1 + \_\_ x_2 = \_\_$.
$\_\_ x_1 + \_\_ x_2 = \_\_$.
Answer(s) submitted:
- 4
- 4
- 9
- -3
- 2
- -4

(correct)

4. (1 point)
Let $\mathbf{a}_1 = \begin{bmatrix}2\\2\end{bmatrix}$, $\mathbf{a}_2 = \begin{bmatrix}2\\-3\end{bmatrix}$, and $\mathbf{b} = \begin{bmatrix}-4\\16\end{bmatrix}$.
Is $\mathbf{b}$ a linear combination of $\mathbf{a}_1$ and $\mathbf{a}_2$?
- A. $\mathbf{b}$ is not a linear combination.
- B. Yes $\mathbf{b}$ is a linear combination.
- C. We cannot tell if $\mathbf{b}$ is a linear combination.

Either fill in the coefficients of the vector equation, or enter "NONE" if no solution is possible.
$\mathbf{b} = \_\_\mathbf{a}_1 + \_\_\mathbf{a}_2$
Answer(s) submitted:
- B
- -6
- -4

(score 0.6666666865348816)

5. (1 point)
Let $\mathbf{a}_1 = \begin{bmatrix}-7\\6\end{bmatrix}$ and $\mathbf{b} = \begin{bmatrix}14\\-12\end{bmatrix}$.
Is $\mathbf{b}$ in the span of of $\mathbf{a}_1$?
- A. Yes, $\mathbf{b}$ is in the span.
- B. No, $\mathbf{b}$ is not in the span.
- C. We cannot tell if $\mathbf{b}$ is in the span.

Either fill in the coefficients of the vector equation, or enter "NONE" if no solution is possible.
$\mathbf{b} = \_\_\mathbf{a}_1$
Answer(s) submitted:
- A
- -2

(correct)

6. (1 point)
Let $\mathbf{a}_1 = \begin{bmatrix}3\\5\\1\end{bmatrix}$, $\mathbf{a}_2 = \begin{bmatrix}-9\\-14\\-8\end{bmatrix}$, and $\mathbf{b} = \begin{bmatrix}3\\6\\-3\end{bmatrix}$.
Is $\mathbf{b}$ a linear combination of $\mathbf{a}_1$ and $\mathbf{a}_2$?
- A. Yes, $\mathbf{b}$ is a linear combination.
- B. No, $\mathbf{b}$ is not a linear combination.
- C. We cannot tell if $\mathbf{b}$ is a linear combination.

Either fill in the coefficients of the vector equation, or enter "NONE" if no solution is possible.
$\mathbf{b} = \_\_\mathbf{a}_1 + \_\_\mathbf{a}_2$

Answer(s) submitted:

- B
- NONE
- NONE

(correct)

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7. (1 point)

Let $\mathbf{a}_1 = \begin{bmatrix} -9 \\ 6 \\ 8 \end{bmatrix}$, $\mathbf{a}_2 = \begin{bmatrix} 6 \\ 2 \\ 5 \end{bmatrix}$, and $\mathbf{b} = \begin{bmatrix} -57 \\ 26 \\ 30 \end{bmatrix}$.

Is $\mathbf{b}$ in the span of of $\mathbf{a}_1$ and $\mathbf{a}_2$?

- A. Yes, $\mathbf{b}$ is in the span.
- B. No, $\mathbf{b}$ is not in the span.
- C. We cannot tell if $\mathbf{b}$ is in the span.

Either fill in the coefficients of the vector equation, or enter "NONE" if no solution is possible.

$\mathbf{b} =$ ___ $\mathbf{a}_1 +$ ___ $\mathbf{a}_2$

Answer(s) submitted:

- A
- -3
- 6

(score 0.3333333432674408)

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8. (1 point)

Let $\mathbf{a}_1 = \begin{bmatrix} -2 \\ 7 \\ -9 \end{bmatrix}$, $\mathbf{a}_2 = \begin{bmatrix} -7 \\ 3 \\ -2 \end{bmatrix}$, and $\mathbf{b} = \begin{bmatrix} 13 \\ -24 \\ 30 \end{bmatrix}$.

Is $\mathbf{b}$ in the span of of $\mathbf{a}_1$ and $\mathbf{a}_2$?

- A. Yes, $\mathbf{b}$ is in the span.
- B. No, $\mathbf{b}$ is not in the span.
- C. We cannot tell if $\mathbf{b}$ is in the span.

Either fill in the coefficients of the vector equation, or enter "NONE" if no solution is possible.

$\mathbf{b} =$ ___ $\mathbf{a}_1 +$ ___ $\mathbf{a}_2$

Answer(s) submitted:

- B
- NONE
- NONE

(correct)

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9. (1 point)

Let $\mathbf{u}_1 = \begin{bmatrix} 4 \\ -4 \end{bmatrix}$, and $\mathbf{u}_2 = \begin{bmatrix} -20 \\ 25 \end{bmatrix}$.

Select all of the vectors that are in the span of $\{\mathbf{u}_1, \mathbf{u}_2\}$. (Check every statement that is correct.)

- A. The vector $7\begin{bmatrix} -20 \\ 25 \end{bmatrix} - 3\begin{bmatrix} 4 \\ -4 \end{bmatrix}$ is in the span.
- B. The vector $-3\begin{bmatrix} 4 \\ -4 \end{bmatrix}$ is in the span.
- C. All vectors in $\mathbb{R}^2$ are in the span.
- D. The vector $\begin{bmatrix} -20 \\ 25 \end{bmatrix}$ is in the span.
- E. The vector $\begin{bmatrix} 4 \\ -4 \end{bmatrix}$ is in the span.
- F. The vector $\begin{bmatrix} 0 \\ 0 \end{bmatrix}$ is in the span.
- G. We cannot tell which vectors are in the span.

Answer(s) submitted:

- (A, B, D, E)

(incorrect)

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10. (1 point) Evaluate the following matrix product.

$$\begin{bmatrix} -3 & -4 & 0 \\ -4 & -1 & 3 \\ -3 & 1 & -4 \end{bmatrix} \begin{bmatrix} -5 \\ 4 \\ -5 \end{bmatrix} = \begin{bmatrix} \_\_ \\ \_\_ \\ \_\_ \end{bmatrix}$$

Answer(s) submitted:

- -1

(correct)

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11. (1 point)

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

$$5x_1 - 3x_2 - 1x_3 = -5$$

$$9x_1 + 7x_2 - 2x_3 = 8$$

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

Answer(s) submitted:

- 5
- -3
- -1
- 9
- 7
- -2
- -5
- 8

(correct)

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12. (1 point)

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

$$2x_1 - 1x_2 - 8x_3 = -8$$

$$1x_1 + 6x_2 + 8x_3 = 9$$

$$-3x_1 + 9x_2 + 4x_3 = -3$$

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

Answer(s) submitted:

- 2
- -1
- -8
- 1
- 6
- 8

- −3
- 9
- 4
- −8

- 9
- −3

(correct)