1. Which set of three-by-one matrices (with real number scalars) is not a vector space?

0 / 1 punto

- ⦿ The set of three-by-one matrices with zero in the third row.
- ◯ The set of three-by-one matrices with the first row one larger than the third row.
- ◯ The set of three-by-one matrices with the sum of all the rows equal to zero.
- ◯ The set of three-by-one matrices with the first row equal to the negative of the third row.

⊗ **Incorrecto**
  Review Vector Spaces ⬈ and associated practice problems.

2. Which of the following sets of vectors are linearly independent?

1 / 1 punto

- ◯ $\left\{ \begin{pmatrix} 2 \\ 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ -1 \\ 2 \end{pmatrix}, \begin{pmatrix} 2 \\ 3 \\ -1 \end{pmatrix} \right\}$

- ◯ $\left\{ \begin{pmatrix} 1 \\ -3 \\ 4 \end{pmatrix}, \begin{pmatrix} 0 \\ -1 \\ 1 \end{pmatrix}, \begin{pmatrix} 3 \\ 2 \\ 1 \end{pmatrix} \right\}$

- ◯ $\left\{ \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ -4 \\ 5 \end{pmatrix}, \begin{pmatrix} 3 \\ 2 \\ 1 \end{pmatrix} \right\}$

- ⦿ $\left\{ \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix}, \begin{pmatrix} 2 \\ 1 \\ 2 \end{pmatrix} \right\}$

⊘ **Correcto**

3. What is the dimension of the vector space consisting of five-by-one column matrices where the rows sum to zero and the first row is equal to the second row?

1 / 1 punto

- ◯ 5
- ◯ 4
- ⦿ 3
- ◯ 2

⊘ **Correcto**

4. Which of the following is NOT an orthonormal basis for the vector space of all three-by-one matrices with the first row equal to twice the third row?

0 / 1 punto

- ◯ $\left\{ \frac{1}{\sqrt{5}} \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} \right\}$

- ◯ $\left\{ \frac{1}{\sqrt{6}} \begin{pmatrix} 2 \\ 1 \\ 1 \end{pmatrix}, \frac{1}{\sqrt{30}} \begin{pmatrix} 2 \\ -5 \\ 1 \end{pmatrix} \right\}$

- ◯ $\left\{ \frac{1}{\sqrt{6}} \begin{pmatrix} 2 \\ -1 \\ 1 \end{pmatrix}, \frac{1}{\sqrt{30}} \begin{pmatrix} 2 \\ 5 \\ 1 \end{pmatrix} \right\}$

- ◯ $\left\{ \frac{1}{\sqrt{5}} \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix}, \frac{1}{\sqrt{6}} \begin{pmatrix} 2 \\ 0 \\ -1 \end{pmatrix} \right\}$

⊗ **Incorrecto**
  No seleccionaste una respuesta.

5. The Gram-Schmidt process applied to

$$\{v_1, v_2\} = \left\{ \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \end{pmatrix} \right\}$$

results in

⦿ $\{u_1, u_2\} = \left\{ \dfrac{1}{\sqrt{2}} \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \dfrac{1}{\sqrt{2}} \begin{pmatrix} 1 \\ -1 \end{pmatrix} \right\}$

○ $\{u_1, u_2\} = \left\{ \begin{pmatrix} 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \end{pmatrix} \right\}$

○ $\{u_1, u_2\} = \left\{ \dfrac{1}{\sqrt{2}} \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \end{pmatrix} \right\}$

○ $\{u_1, u_2\} = \left\{ \dfrac{1}{\sqrt{2}} \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \dfrac{1}{\sqrt{2}} \begin{pmatrix} -1 \\ 1 \end{pmatrix} \right\}$

✓ **Correcto**

6. Which of the following sets of vectors form a basis for the null space of

$$\begin{pmatrix} 1 & -1 & 1 & 1 \\ 4 & -4 & 3 & 6 \\ 2 & -2 & 1 & 3 \end{pmatrix}?$$

○ $\left\{ \begin{pmatrix} 1 \\ 0 \\ -1 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ 0 \\ -1 \end{pmatrix} \right\}$

○ $\left\{ \begin{pmatrix} 1 \\ 1 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ -1 \\ 0 \end{pmatrix} \right\}$

○ $\left\{ \begin{pmatrix} 1 \\ 0 \\ -1 \\ 0 \end{pmatrix} \right\}$

⦿ $\left\{ \begin{pmatrix} 1 \\ 1 \\ 0 \\ 0 \end{pmatrix} \right\}$

7. The general solution to the system of equations given by

$$x_1 - x_2 + x_3 + x_4 = 1,$$

$$4x_1 - 4x_2 + 3x_3 + 6x_4 = 0,$$

$$2x_1 - 2x_2 + x_3 + 3x_4 = 0,$$

is

○ $a \begin{pmatrix} 1 \\ 0 \\ -1 \\ 0 \end{pmatrix} + \begin{pmatrix} 3 \\ 0 \\ 0 \\ -2 \end{pmatrix}$

⦿ $a \begin{pmatrix} 1 \\ 1 \\ 0 \\ 0 \end{pmatrix} + \begin{pmatrix} 3 \\ 0 \\ 0 \\ -2 \end{pmatrix}$

○ $a \begin{pmatrix} 1 \\ 0 \\ -1 \\ 0 \end{pmatrix} + b \begin{pmatrix} 3 \\ 0 \\ 0 \\ -2 \end{pmatrix} + \begin{pmatrix} 1 \\ 1 \\ 0 \\ 0 \end{pmatrix}$

○ $\begin{pmatrix} 1 \\ \end{pmatrix} \quad \begin{pmatrix} 3 \\ \end{pmatrix} \quad \begin{pmatrix} 1 \\ \end{pmatrix}$

$$\bigcirc \quad a \begin{pmatrix} 1 \\ 1 \\ 0 \\ 0 \end{pmatrix} + b \begin{pmatrix} 3 \\ 0 \\ 0 \\ -2 \end{pmatrix} + \begin{pmatrix} 1 \\ 0 \\ -1 \\ 0 \end{pmatrix}$$

✓ Correcto

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8. What is the rank of the following matrix: 1/1 punto

$$\begin{pmatrix} 1 & -2 & 0 & 1 \\ 2 & -4 & 1 & 2 \\ 3 & -6 & 1 & 3 \end{pmatrix} ?$$

◯ 1

◉ 2

◯ 3

◯ 4

✓ Correcto

9.   1/1 punte

Which vector is the orthogonal projection of $\mathbf{v} = \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}$ onto $W = \text{span}\left\{ \begin{pmatrix} 1 \\ 1 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ -2 \\ -1 \end{pmatrix} \right\} ?$

$$\bigcirc \quad \begin{pmatrix} 4 \\ -2 \\ -4 \end{pmatrix}$$

$$\bigodot \quad \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}$$

$$\bigcirc \quad \begin{pmatrix} \dfrac{2}{\sqrt{3}} + \dfrac{2}{\sqrt{6}} \\ \dfrac{2}{\sqrt{3}} - \dfrac{4}{\sqrt{6}} \\ -\dfrac{2}{\sqrt{3}} - \dfrac{2}{\sqrt{6}} \end{pmatrix}$$

$$\bigcirc \quad \dfrac{1}{\sqrt{2}} \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}$$

✓ Correcto

10. Suppose we have data points given by $(x_n, y_n) = (0,0), (1,2),$ and $(2,1)$. Which is the best fit line to the data?   1/1 punto

◯ $y = 1$

◯ $y = x$

◉ $y = \dfrac{1}{2} + \dfrac{1}{2}x$

◯ $y = \dfrac{3}{2} - \dfrac{1}{4}x$

✓ Correcto