

Name _____

Mathematics 1553

Quiz 3

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1. Suppose that u , v , and w are three different vectors in \mathbb{R}^3 . Which of the following are possibilities for $\text{Span}\{u, v, w\}$? Select all that apply.

(a) a point

(b) a line

(c) a plane

(d) \mathbb{R}^3

(e) none of the above

2. Complete the following definition: A linear combination of the vectors $\{v_1, \dots, v_k\}$ is...

a vector $x_1v_1 + x_2v_2 + \dots + x_kv_k$, where x_1, \dots, x_k are real numbers

Turn the page over!

3. Consider the following question:

$$\text{Is } \begin{pmatrix} 3 \\ 4 \\ 5 \end{pmatrix} \text{ a linear combination of } \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} \text{ and } \begin{pmatrix} 4 \\ 5 \\ 4 \end{pmatrix}?$$

Write down the corresponding vector equation.

$$x_1 \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} + x_2 \begin{pmatrix} 4 \\ 5 \\ 4 \end{pmatrix} = \begin{pmatrix} 3 \\ 4 \\ 5 \end{pmatrix}$$

Write down the corresponding augmented matrix.

$$\left(\begin{array}{cc|c} 1 & 4 & 3 \\ 1 & 5 & 4 \\ 1 & 4 & 5 \end{array} \right)$$

Is $(3, 4, 5)$ in the span of $(1, 1, 1)$ and $(4, 5, 4)$?

YES

NO

$$\left(\begin{array}{cc|c} 1 & 4 & 3 \\ 1 & 5 & 4 \\ 1 & 4 & 5 \end{array} \right) \xrightarrow{\substack{R_2 = R_2 - R_1 \\ R_3 = R_3 - R_1}} \left(\begin{array}{cc|c} 1 & 4 & 3 \\ 0 & 1 & 1 \\ 0 & 0 & 2 \end{array} \right) \leftarrow \text{Inconsistent}$$