

QUIZ 2 VERSION A AND B

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1. (3 points) Given

$$\mathbf{a} = \begin{bmatrix} 6 \\ 5 \end{bmatrix}, \mathbf{b} = \begin{bmatrix} 2 \\ -4 \end{bmatrix}.$$

(1) Write down the parametric equation of the line through \mathbf{a} and \mathbf{b} .

$$\text{Solution: } \mathbf{x} = \begin{bmatrix} 6 \\ 5 \end{bmatrix} + t \begin{bmatrix} 2 \\ -4 \end{bmatrix}.$$

(2) Write down the parametric equation of the line through \mathbf{a} parallel to \mathbf{b} .

$$\text{Solution: } \mathbf{x} = t \begin{bmatrix} 6 \\ 5 \end{bmatrix} + (1-t) \begin{bmatrix} 2 \\ -4 \end{bmatrix}.$$

2.(3 points) Determine if \mathbf{b} is a linear combination of $\mathbf{a}_1, \mathbf{a}_2$ and \mathbf{a}_3 . If so, write down the linear combination.

$$\mathbf{a}_1 = \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}, \mathbf{a}_2 = \begin{bmatrix} 1 \\ 3 \\ 9 \end{bmatrix}, \mathbf{a}_3 = \begin{bmatrix} 1 \\ 5 \\ 25 \end{bmatrix}, \mathbf{b} = \begin{bmatrix} -1 \\ -2 \\ 8 \end{bmatrix}$$

Solution: $\mathbf{b} = 3\mathbf{a}_1 - 6\mathbf{a}_2 + 2\mathbf{a}_3$

$$\mathbf{a}_1 = \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}, \mathbf{a}_2 = \begin{bmatrix} 1 \\ 3 \\ 9 \end{bmatrix}, \mathbf{a}_3 = \begin{bmatrix} 1 \\ 4 \\ 16 \end{bmatrix}, \mathbf{b} = \begin{bmatrix} -1 \\ -3 \\ -7 \end{bmatrix}$$

Solution: $\mathbf{b} = \mathbf{a}_1 - 3\mathbf{a}_2 + \mathbf{a}_3$

3.(3 points) Determine if the vectors are linearly independent.

$$\mathbf{a}_1 = \begin{bmatrix} 1 \\ -2 \\ -3 \end{bmatrix}, \mathbf{a}_2 = \begin{bmatrix} 1 \\ 6 \\ 5 \end{bmatrix}, \mathbf{a}_3 = \begin{bmatrix} 2 \\ -4 \\ -3 \end{bmatrix},$$

Solution: Yes

$$\mathbf{a}_1 = \begin{bmatrix} 1 \\ -2 \\ -3 \end{bmatrix}, \mathbf{a}_2 = \begin{bmatrix} 1 \\ 6 \\ 5 \end{bmatrix}, \mathbf{a}_3 = \begin{bmatrix} 2 \\ -4 \\ -2 \end{bmatrix},$$

Solution: Yes