

Name SOLUTIONS

Mathematics 1553

Quiz 3

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Section G1/Arjun G2/Talha G3/Athreya G4/Olivia G5/James (circle one!)

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1. Complete the following definition: *The span of the vectors v_1, \dots, v_k is...*

the set of linear combinations
of v_1, \dots, v_k

2. Describe the span of the following set of vectors:

$$\left\{ \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 7 \\ 7 \\ 7 \end{pmatrix}, \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} \right\}$$

(a) \mathbb{R}^2

(b) three points in \mathbb{R}^3

(c) a line in \mathbb{R}^3

(d) a plane in \mathbb{R}^3

(e) \mathbb{R}^3

Turn the page!

1. Consider the following question:

Is the vector $\begin{pmatrix} 3 \\ 6 \\ 9 \end{pmatrix}$ in the span of the vectors $\begin{pmatrix} 1 \\ 4 \\ 7 \end{pmatrix}$ and $\begin{pmatrix} 2 \\ 5 \\ 8 \end{pmatrix}$?

Write down the corresponding vector equation.

$$x \begin{pmatrix} 1 \\ 4 \\ 7 \end{pmatrix} + y \begin{pmatrix} 2 \\ 5 \\ 8 \end{pmatrix} = \begin{pmatrix} 3 \\ 6 \\ 9 \end{pmatrix}$$

Write down the corresponding matrix equation.

$$\begin{pmatrix} 1 & 2 \\ 4 & 5 \\ 7 & 8 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 \\ 6 \\ 9 \end{pmatrix}$$

Write down the augmented matrix for the corresponding linear system.

$$\left(\begin{array}{cc|c} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{array} \right)$$