Name:

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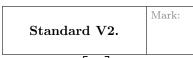
Date:

MASTERY QUIZ DAY 9

Math 237 – Linear Algebra Fall 2017

Version 4

Show all work. Answers without work will not receive credit. You may use a calculator, but you must show all relevant work to receive credit for a standard.



Determine if $\begin{bmatrix} 0 \\ -1 \\ 2 \\ 6 \end{bmatrix}$ can be written as a linear combination of the vectors $\begin{bmatrix} 3 \\ -1 \\ -1 \\ 0 \end{bmatrix}$ and $\begin{bmatrix} -1 \\ 0 \\ 1 \\ 2 \end{bmatrix}$.

Solution:

$$\operatorname{RREF}\left(\left[\begin{array}{ccc|c}
3 & -1 & 0 \\
-1 & 0 & -1 \\
-1 & 1 & 2 \\
0 & 2 & 6
\end{array}\right]\right) = \left[\begin{array}{ccc|c}
1 & 0 & 1 \\
0 & 1 & 3 \\
0 & 0 & 0 \\
0 & 0 & 0
\end{array}\right]$$

Since this system has a solution, $\begin{bmatrix} 0 \\ -1 \\ 2 \\ 6 \end{bmatrix}$ can be written as a linear combination of the vectors $\begin{bmatrix} 3 \\ -1 \\ -1 \\ 0 \end{bmatrix}$ and

$$\begin{bmatrix} -1\\0\\1\\2 \end{bmatrix}, \text{ namely }$$

$$\begin{bmatrix} 0 \\ -1 \\ 2 \\ 6 \end{bmatrix} = \begin{bmatrix} 3 \\ -1 \\ -1 \\ 0 \end{bmatrix} + 3 \begin{bmatrix} -1 \\ 0 \\ 1 \\ 2 \end{bmatrix}.$$

Additional Notes/Marks