Math 40 - Section —
HW 6 - Subspaces, Basis, Dimension, and Rank
Tuesday, February 9, 2016

3.5.{12, 18, 20, 46, 48, 58}

3.5.12 Determine whether **b** is in $col(A)$ and whether **w** is in $row(A)$, as in Example 3.41.

$$A = \begin{bmatrix} 1 & 1 & -3 \\ 0 & 2 & 1 \\ 1 & -1 & -4 \end{bmatrix}, \mathbf{b} = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \mathbf{w} = \begin{bmatrix} 2 & 4 & -5 \end{bmatrix}$$

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3.5.18 Give bases for $row(A)$, $col(A)$, and $null(A)$.

$$A = \begin{bmatrix} 1 & 1 & -3 \\ 0 & 2 & 1 \\ 1 & -1 & -4 \end{bmatrix}$$

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3.5.20 Give bases for $row(A)$, $col(A)$, and $null(A)$.

$$A = \begin{bmatrix} 2 & -4 & 0 & 2 & 1 \\ -1 & 2 & 1 & 2 & 3 \\ 1 & -2 & 1 & 4 & 4 \end{bmatrix}$$

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3.5.46 Answer Exercises 45 - 48 by considering the matrix with the given vectors as its columns. Do $\begin{bmatrix} 1 \\ -1 \\ 3 \end{bmatrix}$, $\begin{bmatrix} -1 \\ 5 \\ 1 \end{bmatrix}$, $\begin{bmatrix} 1 \\ -3 \\ 1 \end{bmatrix}$ form a basis for $\mathbb{R}^3$?

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3.4.48 Answer Exercises 45 - 48 by considering the matrix with the given vectors as its columns. Do $\begin{bmatrix} 1 \\ -1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 0 \\ -1 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ -1 \\ 1 \end{bmatrix}, \begin{bmatrix} -1 \\ 0 \\ 1 \\ 0 \end{bmatrix}$ form a basis for $\mathbb{R}^4$?

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$\boxed{\textbf{3.5.58} \text{ If } A \text{ and } B \text{ are } n \times n \text{ matrices of rank } n\text{, prove that } AB \text{ has rank } n.}$

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