

Homework - July 2
Section 4.2

2. Multiply $\begin{bmatrix} 5 & 21 & 19 \\ 13 & 23 & 2 \\ 8 & 14 & 1 \end{bmatrix} \begin{bmatrix} 5 \\ -3 \\ 2 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$. Thus \mathbf{w} is in Nul A .

16. $A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 1 & 1 \\ 0 & 5 & -4 \\ 0 & 0 & 1 \end{bmatrix}$.

22. To find a nonzero vector in Nul A , solve the matrix equation $A\mathbf{x} = \mathbf{0}$. We have $\begin{bmatrix} 1 & 3 & 5 & 0 & 0 \\ 0 & 1 & 4 & -2 & 0 \end{bmatrix} \sim \begin{bmatrix} 1 & 0 & -7 & 6 & 0 \\ 0 & 1 & 4 & -2 & 0 \end{bmatrix}$. Vectors in Nul A have the

form $x_3 \begin{bmatrix} 7 \\ -4 \\ 1 \\ 0 \end{bmatrix} + x_4 \begin{bmatrix} -6 \\ 2 \\ 0 \\ 1 \end{bmatrix}$, so $\begin{bmatrix} 1 \\ -2 \\ 1 \\ 1 \end{bmatrix}$ is a nonzero vector in Nul A . Any column,

say $\begin{bmatrix} 3 \\ 1 \end{bmatrix}$, is a nonzero vector in Col A .