

Name:

1. Let  $\mathbf{u} = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$ . Find a basis for the following subspace of  $M_{32}$ :

$$S = \{A \in M_{32} \mid A\mathbf{u} = \mathbf{0}\}.$$

2. Let

$$B = \left\{ \begin{pmatrix} 1 \\ -1 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ -3 \\ 1 \end{pmatrix} \right\}$$

and  $\mathbf{x} = \begin{pmatrix} 2 \\ 1 \\ 1 \end{pmatrix}$ . Find  $[\mathbf{x}]_B$ .