

# Homework 27 MATH 304 Section 3

**Assigned:** Monday, December 8.  
**Potentially Collected:** Friday, December 12.

1. Find an orthonormal basis for the subspace of  $\mathbb{R}^3$  spanned by

$$\left\{ \begin{bmatrix} 1 \\ 0 \\ -2 \end{bmatrix}, \begin{bmatrix} -3 \\ 2 \\ 1 \end{bmatrix}, \begin{bmatrix} -1 \\ 2 \\ -3 \end{bmatrix} \right\}$$

2. Find an orthonormal basis for the null space of each of the following matrices

$$A = \begin{bmatrix} 1 & 1 & -1 \\ 2 & 1 & 3 \\ 1 & 2 & -6 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 1 & -1 \\ 2 & 1 & 2 \end{bmatrix}$$

3. Find an orthonormal basis for each of the following subspaces.

(a)  $\left\{ \begin{bmatrix} a \\ a+b \\ b \end{bmatrix} : a, b \in \mathbb{R} \right\}$

(b)  $\left\{ \begin{bmatrix} a \\ a+b \\ c \\ b+c \end{bmatrix} : a, b, c \in \mathbb{R} \right\}$

(c)  $\left\{ \begin{bmatrix} a \\ b \\ c \end{bmatrix} : a+b+c=0 \right\}$

(d)  $\left\{ \begin{bmatrix} a \\ b \\ c \\ d \end{bmatrix} : a-b-2c+d=0 \right\}$