

**Math 60**  
**Homework 3**

Name \_\_\_\_\_  
Due Monday September 26 before 4:00 PM

1. Find a basis for the span of  $\{(1, 2, 3, 1), (2, 0, 1, -1), (3, 2, 4, 0), (1, -2, -2, -2)\} \subset \mathbb{R}^4$ .
2. Find a basis for the span of  $\{(1, 2, 4, 2), (2, 0, 1, 4), (3, 1, 4, 1), (2, 1, 1, 2)\} \subset (\mathbb{Z}_5)^4$ .

3. Find the rank of the matrix  $A = \begin{bmatrix} 1 & 2 & 1 & 0 & -1 \\ 3 & 1 & -2 & 1 & 3 \\ -1 & 1 & 2 & 1 & 3 \\ 0 & 1 & 1 & 2 & 1 \end{bmatrix} \in M_{4,5}(\mathbb{R})$ .

4. Find the dimension of  $S \cap T \subset \mathbb{R}^4$  where

$$S = \text{Span}((1, 1, 2, 1), (0, 1, -1, 1)) \subset \mathbb{R}^4 \quad \text{and} \quad T = \text{Span}((-1, 1, 1, 0), (0, 3, 2, 2)) \subset \mathbb{R}^4$$