

WORKSHEET 9/29/22
MATH 2331, FALL 2022

- (1) Describe the span of $\left\{ \begin{bmatrix} 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \end{bmatrix} \right\}$.
- (2) Describe the span of $\left\{ \begin{bmatrix} 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 2 \\ 0 \end{bmatrix} \right\}$.
- (3) Find a collection of vectors that spans the image of each matrix. Be as efficient as you can!
- (a) $\begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
- (b) $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$
- (c) $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{bmatrix}$
- (4) Are the the column vectors of the matrix from part (c) linearly independent?
- (5) Are there any nontrivial linear relations among the vectors $\vec{v}_1 = (1, 2, 3)$, $\vec{v}_2 = (4, 5, 6)$, and $\vec{v} = (7, 8, 9)$?
- (6) How large could a collection of linearly independent vectors in \mathbb{R}^n be?
- (7) Suppose that \vec{v}_1 , \vec{v}_2 , and \vec{v}_3 are linearly independent vectors. How many ways could there be to write a vector \vec{v} as a linear combination of these vectors?