Week 10: Review
MATH 33A
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3.1.31 Give an example of a matrix A such that $im(A)$ is the plane with normal vector $\begin{bmatrix}1\\3\\2\end{bmatrix}$.

3.1.33 Give an example of a linear transformation whose kernel is the plane $x + 2y + 3z = 0$ in $\mathbb{R}^3$.

3.2.37 Let $T : \mathbb{R}^n \to \mathbb{R}^p$ be a linear transformation, and let $v_1, \cdots, v_m \in \mathbb{R}^n$ be linearly independent. Are $T(v_1), \cdots, T(v_m)$ linearly independent as well?

3.3.36 Can you find a 3×3 matrix A with $\ker(A) = Im(A)$?

3.4.55 Let $\beta_1 = \{\begin{bmatrix}1\\1\end{bmatrix}, \begin{bmatrix}1\\2\end{bmatrix}\}$ and $\beta_1 = \{\begin{bmatrix}1\\2\end{bmatrix}, \begin{bmatrix}3\\4\end{bmatrix}\}$. Find P such that $[x]_{\beta_1} = P[x]_{\beta_2}$.

5.2.32 Find an orthonormal basis for the plane $x_1 + x_2 + x_3 = 0$.

6.1.43/44 What is the relationship between $\det(A)$ and $\det(-A)$? How about $\det(A)$ and $\det(A^{-1})$?

7.2.10 Find all real eigenvalues of the following matrix, counting multiplicity (algebraic and geometric). Is it diagonalizable?

$$\begin{bmatrix} -3 & 0 & 4 \\ 0 & -1 & 0 \\ -2 & -7 & 3 \end{bmatrix}$$