$\begin{array}{c} \text{Week 9} \\ \text{MATH 33A} \end{array}$

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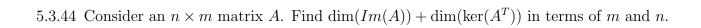
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5.3.33 Find all orthogonal 2×2 matrices.

5.3.37 Is there an orthogonal transformation
$$T$$
 from \mathbb{R}^3 to itself such that $T\begin{bmatrix}2\\3\\0\end{bmatrix}=\begin{bmatrix}3\\0\\2\end{bmatrix}$ and

$$T \begin{bmatrix} -3\\2\\0 \end{bmatrix} = \begin{bmatrix} 2\\-3\\0 \end{bmatrix}?$$



5.4.18 Does the equation $rank(A^TA) = rank(AA^T)$ hold for all $n \times m$ matrices A?

- 5.4.22 Find the least squares solution x^* of the system Ax = b, where $A = \begin{bmatrix} 3 & 2 \\ 5 & 3 \\ 4 & 5 \end{bmatrix}$ and
 - $b = \begin{bmatrix} 5 \\ 9 \\ 2 \end{bmatrix}$. Determine the error $||b Ax^*||$.

6.1.30 Let $A=\begin{bmatrix} 4 & 2 & 0 \\ 4 & 6 & 0 \\ 5 & 2 & 3 \end{bmatrix}$. Find λ such that $A-\lambda I$ fails to be invertible.