

“Your Turn”

The Setup. Define $\mathcal{D} : \mathbb{R}^4 \rightarrow \mathbb{R}^4$ by

$$\mathcal{D}([x_1, x_2, x_3, x_4]) = [x_2, 2x_3, 3x_4, 0]$$

The Project.

1. Is \mathcal{D} a linear transformation?
2. What is $\mathcal{R}(T)$?
3. Find $\dim(\mathcal{R}(T))$.
4. What is $\mathcal{N}(T)$?
5. Find $\dim(\mathcal{N}(T))$.
6. Calculate $\dim(\mathcal{R}(T)) + \dim(\mathcal{N}(T))$.

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