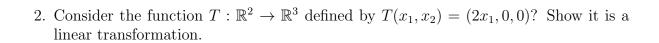
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• (Sec. 3.1) linear transformation, rank, nullity.

LARSON—MATH 610—CLASSROOM WORKSHEET 18 Linear Transformations.

Concepts & Notation

1.	What is a linea	r transformation	T from	a vector spac	e V int	o a vector	space	W?
	What is the <i>nul</i>	$l \ space \ of \ T$? What	at is the	$range ext{ of } T?$				



- 3. Find the null space of T.
- 4. What is the *nullity* of T?
- 5. Find the range of T.
- 6. What is the rank of T?

7. (**Claim:**) If $\alpha_1, \ldots, \alpha_n$ are a basis for a finite-dimensional vector space V and β_1, \ldots, β_n are any vectors in a vector space W then there is a *unique* linear transformation T with $T(\alpha_1) = \beta_1, \ldots, T(\alpha_n) = \beta_n$.

8. (Rank-Nullity Theorem:) If V is a finite-dimensional vector space and T is a linear transformation from V to a vector space W then rank(T) + nullity(T) = dim(V).