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Math 201- Lecture Participation Assignment 1

My favorite three theorems are:

1) Theorem 2:

Let V and W be vector spaces. Let $T: V \to W$ be linear.
If $B = [v_1, v_2, \ldots, v_n]$ forms a basis for V, then

$$Im(T) = \langle T(v_1), T(v_2), \ldots, T(v_n) \rangle .$$

2) Theorem 3:

$T: V \to W$ be linear. If V is finite dimensional, then

$$\dim(Ker(T)) + \dim(Im(T)) = \dim(V)$$

$$\text{nullity } T + \text{rank } T = \dim V$$

3) Theorem 5:

Let V and W be vector spaces with $\dim V = \dim W$ (same dimension and finite) and let $T: V \to W$ be linear. Then the followings are equivalent:

(a) T is injective

(b) T is surjective

(c) rank $T = \dim(Im(T)) = \dim V$.