## 1 | In the context of Linear Algebra (Axler 3.20) #defintion surjective def

A function  $T: V \to W$  is called *surjective* if its range equals W.

1.1 | #aka onto aka

- 1.2 | Properties
- 1.2.1 | A non-surjective map can be made surjective by changing the output space. (intuitive, not in book)
- 1.2.2 | A map to a larger dimensional space is not surjective (Axler3.24)

Suppose V and W are finite-dimensional spaces such that dim  $V < \dim U$ . Then no linear map from V to W is surjective.

1. Intuition Surjectivity means that every element in the output space is mapped to, and that makes this intuitively true: If the number of possible inputs (and by extension, possible outputs) is smaller dimension than the output space, how can every output be mapped to?

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