

Last name \_\_\_\_\_

**First name** \_\_\_\_\_

**LARSON—MATH 310—CLASSROOM WORKSHEET 04**  
**Linear Spaces (Vector Spaces).**

From Chp. 2 of Tsukada, et al., Linear Algebra with Python

Review:  $\mathbb{R}$ , field, complex numbers,  $\mathbb{R}^2$ ,  $\mathbb{K}$ ,  $\mathbb{K}^n$ , linear space (or vector space), subspace.

1. What is a *linear map* (or *linear transformation*)  $f : V \rightarrow W$ , from linear space  $V$  to linear space  $W$ ?
  2. What is an example?
  3. What is the *kernel* of a linear transformation?
  4. What is the *range* of a linear transformation?

**From Chp. 3 of Tsukada, et al., Linear Algebra with Python**

5. What is a *linear combination* of vectors?
  
  
  
  
  
  
  
  
6. What is an example?
  
  
  
  
  
  
  
  
7. What is the subspace *generated* by (or *spanned* by) a set of vectors?
  
  
  
  
  
  
  
  
8. What is an example?
  
  
  
  
  
  
  
  
9. Why is this collection a *subspace*?
  
  
  
  
  
  
  
  
10. What is a *finite-dimensional vector space*?