Worksheet #6: Victor Was My Nerd Name
Date: 09/08/2022
Math 53: Fall 2022
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Problem 1. (Discussion.) In your own words, what is a vector, and what are its properties?[1]

Problem 2. If u and v are vectors of lengths 2 and 3 respectively, what are the largest and smallest possible values of $u \cdot v$? Draw pictures of both situations.

Problem 3. The following are true for vectors $u, v \in \mathbb{R}^3$:

$$u \cdot v = |u||v| \cos\theta$$

$$|u \times v| = |u||v| \sin\theta$$

where θ is the angle between u and v.

- Given u and v, what's the easiest way to compute θ?
- What can you say if $u \cdot v$ is almost as large as or equal to $|u||v|$? When it is almost as negatively large or equal to $-|u||v|$? When it is zero?
- What can you say when $|u \times v|$ is almost as large as or equal to $|u||v| \sin\theta$? When it is zero?

[1] If you respond, "a vector is an element of a vector space," you will be punished severely.