Math 110
Homework due January 24, 2020

Please hand in your assignment to your GSI (physically or electronically) and email a copy to the course instructor, Ken Ribet (`ribet@berkeley.edu`).

1. What is your name?

2. Write a short paragraph about yourself, answering questions like these: What year student are you? Where are you from? Did you come directly to Cal from high school, or did you take a more complicated path? What math courses have you taken so far? What is your major? Why are you taking Math 110? (Add anything else that you'd like. Ignore questions that you'd prefer not to answer.)

3. Express $\dfrac{1}{2i-1}$ in the form $a+bi$ (with a and b real numbers).

4. Find two distinct square roots of i.

5. Prove that $1 \cdot x = x$ for all x in $\mathbf{F}^n$.

6. Is the empty set a vector space?

7. Let V be the $\mathbf{R}$-vector space consisting of all "infinite tuples" $(a_0, a_1, a_2, a_3, \ldots)$ with $a_i \in \mathbf{R}$. Is the set of those tuples such that $\lim\limits_{i \to \infty} a_i = 0$ a subspace of V? How about the set of those tuples with $\lim\limits_{i \to \infty} a_i = +\infty$? Finally, what about the set of those tuples for which $\lim\limits_{i \to \infty} a_i$ exists?