

Week 1: Welcome to the Course

Remark: What's The Point of This Course?

This course is supposed to be *fun* and *magical*. The purpose of this class is to expose you to some cool mathematics, make math less scary, and develop your ability to present ideas in public.

Activity: The Birthday Circle

Everyone arrange yourselves in a big circle according to your date of birth.

Definition: Sets

A **set** is a collection of elements. For example,

$$S = \{1, 2, 3\}$$

contains the numbers 1, 2, 3. The **empty set** contains nothing $\emptyset = \{\}$. We write $x \in S$ to denote x is an element of S . We can write some sets explicitly by listing all their elements. We can also use **set builder notation** such as:

$$S = \{n : n \text{ is even}\} = \{\dots, -4, -2, 0, 2, 4, \dots\}.$$

Example: Operations on Sets

Suppose that $S = \{1, 2, 3, 4\}$ and $T = \{3, 4, 5, 6\}$.

Write $S \cap T$, $S \cup T$, and $S \setminus T$ explicitly as lists of elements.

Remark: Multiple Choice Questions

Our term tests and final exam will be entirely multiple choice. Answering multiple choice questions (MCQs) is a skill. We're going to do a bunch of practice of answering MCQs in class.

Example: Multiple Choice Questions

Let $A = \{2, 4, 6\}$. Which statement is true?

- A) $3 \in A$
- B) $\{2\} \in A$
- C) $4 \in A$
- D) $A \in 4$

Theorem: $\sqrt{2}$ Is Irrational

The square root of two is irrational. Formally, there is no rational number a/b so that $(a/b)^2 = 2$.