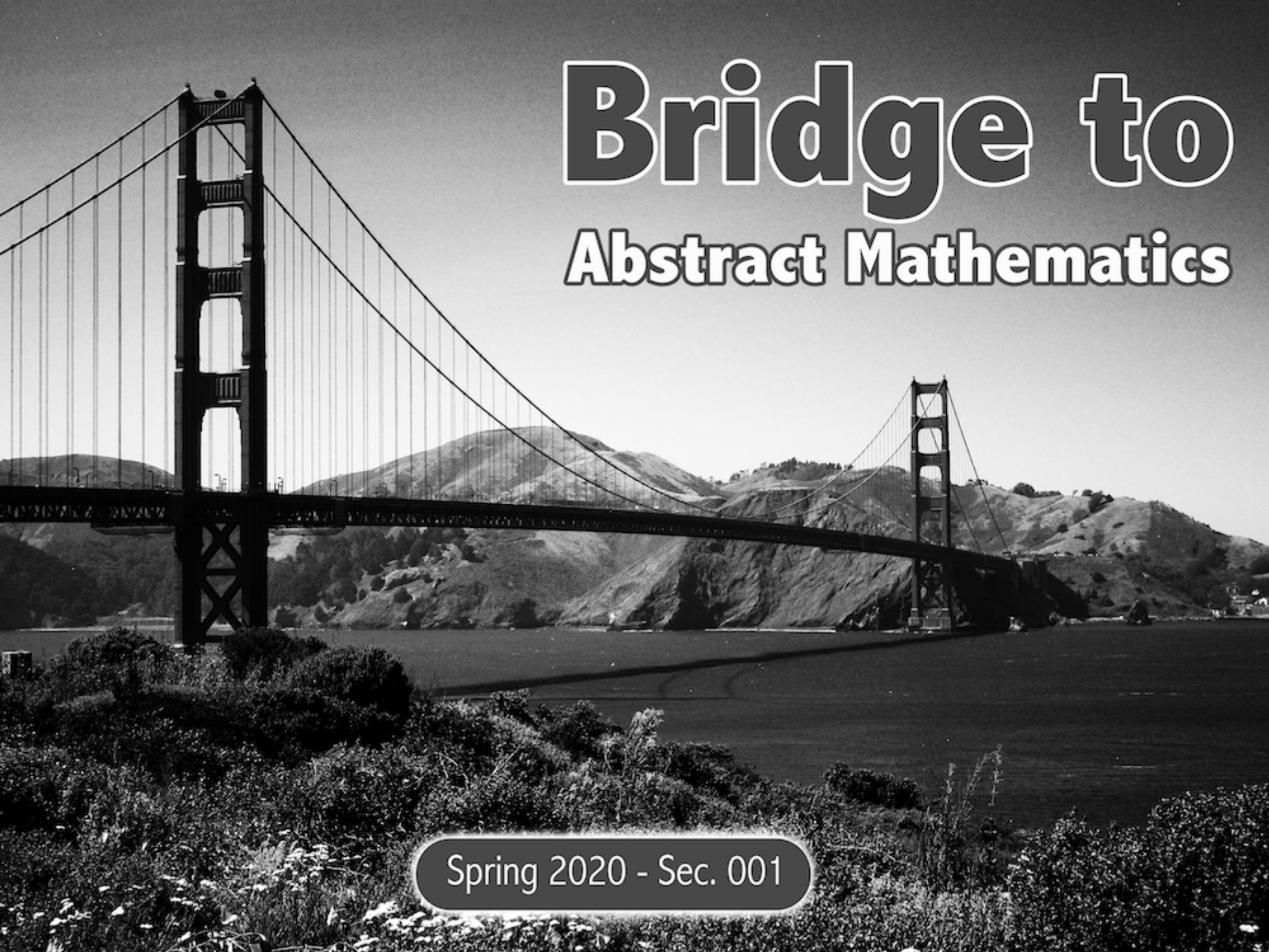
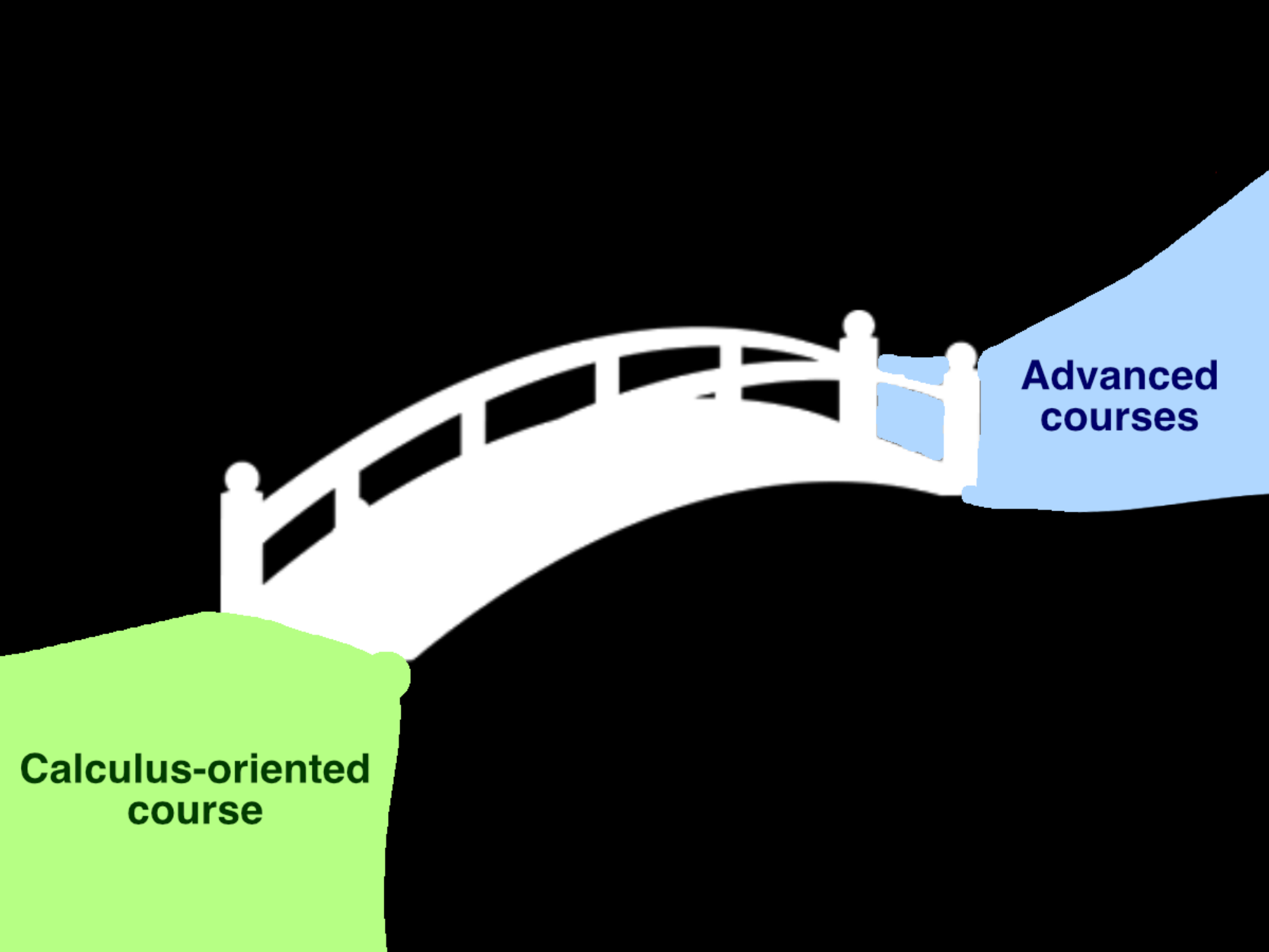
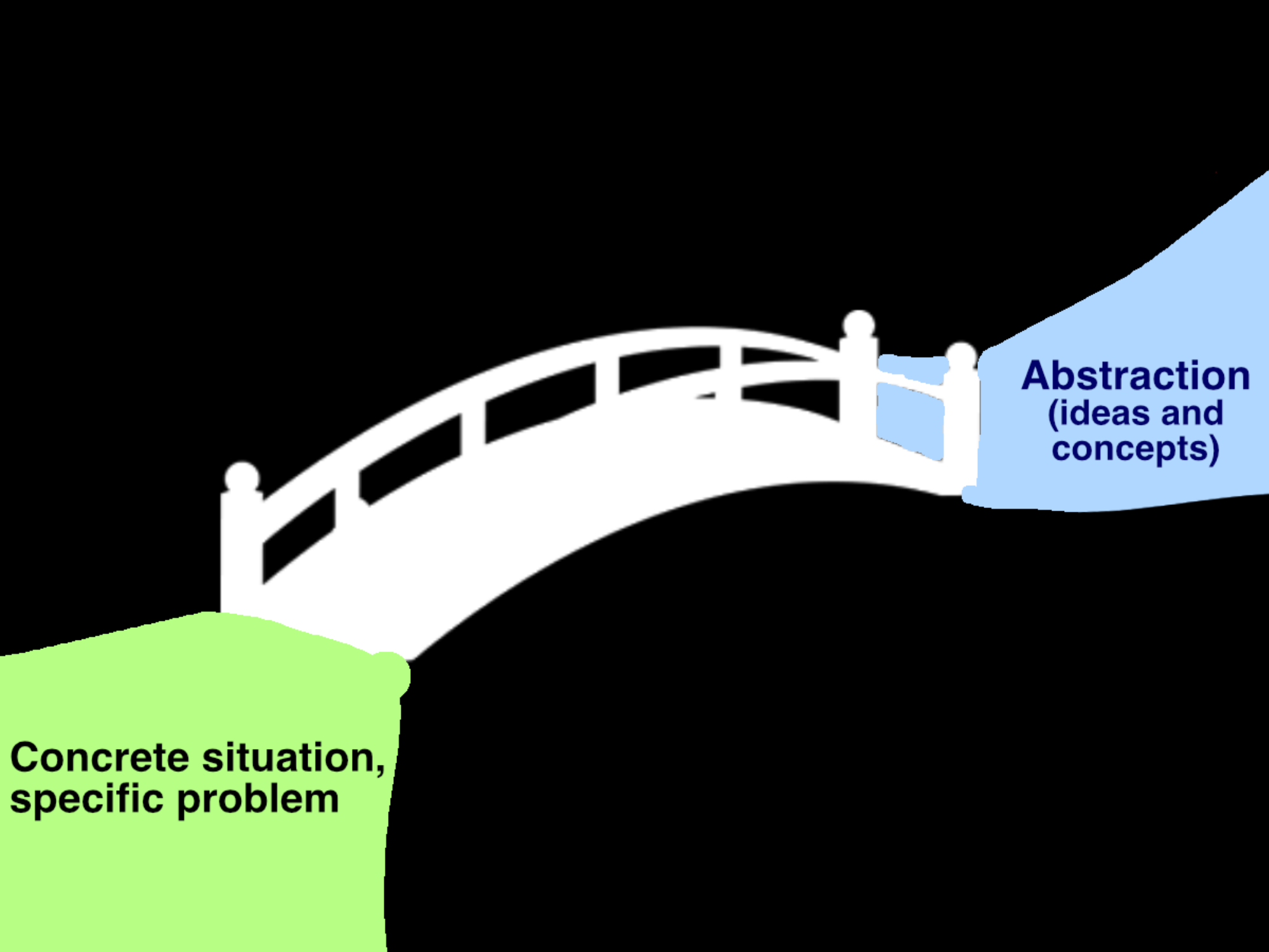

Bridge to
Abstract Mathematics
Spring 2020 - Sec. 001

Why bridge?


Advanced courses
Calculus-oriented course


Abstraction
(ideas and
concepts)
Concrete situation,
specific problem

Example 1

For all positive natural integers n we have that

$$n^2 - 3n + 43$$

is a prime number.

Is it **TRUE** or **FALSE**?

It is **FALSE**, because for $n = 43$ we have:

$$n^2 - 3n + 43 = 1763 = 41 \cdot 43.$$

Example 2

Every even integer strictly greater than 2 can be expressed as the sum of two primes.

Is it **TRUE** or **FALSE**?

We do not know!! This statement is called

Goldbach's conjecture (1742).

Inductive reasoning

- Based on observations, experiments.
- From the specific (the observations) to the general (the theory).
- Conclusion may be probable.

Deductive reasoning

- From premises to conclusion, through logic connections.
- From the general (the theory) to the specific (the observations).
- Conclusion is logical and true.

What is a

?

A diamond is forever

theorem

A ~~diamond~~ is forever

Our main goals

- Fill the gap between calculus courses and advanced courses.
- Learn standard proofs techniques.
- Think, write and express ourselves as a mathematician would do.
- Enjoy!

This course will be useful to **everybody**, not only future researcher in mathematics!

Now it is time for me to
prove you how to have
fun with **proofs**!