

PHILOSOPHY OF MATHEMATICS

Philosophy 319, Fall 2019
Scott Hall 101, M/Th 9:50–11:10
office hours Th 1–2 & by appt

What is mathematics about? Is it about a realm of nonphysical, objectively real entities? Is it just about symbols? Is it about our own minds? Do we know the truth about mathematics, and if so, how? Why is mathematics so useful in science, given that we use proof rather than experiment to learn about mathematics? In this course we will address these and other philosophical questions about mathematics.

Prerequisite

The prerequisite is Philosophy 201 or 202 (Intro logic), but general background in philosophy will also be useful. Comfort with mathematics will help, but no particular knowledge of mathematics is required.

Readings

The only required text is Stewart Shapiro, *Thinking about Mathematics: The Philosophy of Mathematics*. Near the beginning of the semester it might be nice to read through *Mathematics: A Very Short Introduction*, by Timothy Gowers—a wonderful (and short) book on the nature and practice of mathematics. But this is only a suggestion, not a requirement.

Requirements

Two exams (80%), plus short expository writing assignments roughly every other week (20%). The writing assignments must be done completely on your own, and turned in by Sakai. **Late assignments will be penalized 10%; assignments more than 3 days late will not be accepted.** The first exam will be in-class on **October 24**. The second exam, which will cover only the second half of the course, will be during finals week, at **December 23, 8am**, in our regular classroom.

Course website

The course website is:

http://tedsider.org/teaching/math/phil_math.html

Handouts, announcements, etc., will be posted on this website. The Sakai site is:

<https://sakai.rutgers.edu/x/ONbT0p>

Learning goals

The goals of this course are to learn the main epistemological and metaphysical challenges raised by mathematics, to learn some of the main attempts to meet these challenges that have been historically significant, to thereby deepen students' understanding of and appreciation for mathematics, and to develop, through wrestling with these issues, students' skills of critical thinking and abstract reasoning.

Schedule

All readings are in Shapiro unless otherwise noted. The schedule is tentative and will be revised; please consult the latest version of the syllabus, which will always be posted on the course website.

9/5 *Intro*. Skim chapter 2 (skip section 4).

9/9 *Platonism*. p. 49 to the top of 59.

9/12 *Kant*. pp. 73–80; 89–91.

9/16 ...continued. **Assignment 1 due**

9/19 *Mill*. pp. 91–101.

9/23 ...continued

9/26 *Logicism*

9/30 ...continued. **Assignment 2 due**

10/3 ...continued

10/7 ...continued

10/10 *Formalism*

10/14 ...continued. **Assignment 3 due**

10/17 ...continued

10/21 ...continued

10/24 Midterm exam

10/28 *Intuitionism*

10/31 ...continued

11/4 ...continued. **Assignment 4 due**

11/7 ...continued

11/11 *Contemporary "platonism"*

11/14 Gödel

11/18 Set theoretic realism. **Assignment 5 due**

11/21 Application of mathematics

11/25 Indispensability argument

11/26 (Tuesday) *Contemporary "nominalism"*

12/2 ...continued

12/5 *Structuralism*. **Assignment 6 due**

12/9 ...continued

12/23, 8am Second exam