Philosophy 405: Knowledge, Truth and Mathematics Hamilton College
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Reading Guide #8: Cantor

Tiles, "Cantor's Transfinite Paradise"

1. How did mathematicians before Cantor think about the number of points on a line?
2. Distinguish counting and establishing a one-one correspondence between two sets.
3. Can a finite set be put into a one-one correspondence with a proper subset of itself? Can an infinite set be put into a one-one correspondence with a proper subset of itself? How does this difference facilitate a definition of 'infinite'?
4. How, for infinite sets, is the number of their elements different from their sizes?
5. What is the relationship between the size (cardinal number) of a set and the size of its power set? For what kinds of sets does this relation hold?
6. What is a set? What is the cardinal number of a set?
7. How does the arithmetic of infinite cardinalities differ from that of finite cardinalities?
8. How many points are on a line?
9. What is Cantor's continuum hypothesis?
10. What problem arises for defining the sequence of infinite cardinalities?
11. How are ordinals generated by counting? What is a limit ordinal, and what role does it play in the ordinal sequence?
12. What are the first and second number classes? How is the second number class defined in terms of the first? How is the n+1st ordinal class defined in terms of the nth?
13. What is the importance of Cantor's assumption that every set can be well-ordered? How does it lead to a new definition of cardinality?
14. What are the Burali-Forti and Cantor paradoxes? What do they show? How did Cantor respond to the paradoxes?