

Math 145 Test 2 Chapters 3 and 4 Study Sheet

In class portion

Your second test will consist of (2) questions from homework, and (3) essay questions. You will not know in advance which homework problems will appear on the test. Three of these short essay questions will appear on the test. You may bring one 3x5 card with notes.

Possible essay questions:

1. Given a finite set of cardinality n , define its power set and state the cardinality of the power set. If an additional element was added to the original set, how many sets would be added to the power set? Justify your statement with logic. Generalize your discussion to a rule about power sets.
2. Use an example to explain Cantor's diagonal method of showing that the cardinality of the reals must be greater than the cardinality of the natural numbers. Be sure to build on the idea of one-to-oneness.
3. Compare and contrast a "cube" in zero dimensions, one dimension, two dimensions, three dimensions, and 4th dimension. Include a discussion of the idea of a "slide." Include sketches. Discuss the advantages of a 3-d person examining a 2- world and the disadvantages of a 3-d person examining a 4-d world.
4. Describe the method used to construct a golden rectangle. Based on your method prove that the small rectangle within the original golden rectangle is also golden. Explain why it is golden. Briefly discuss how golden rectangles relate to Fibonacci numbers.
5. Explain two geometric proofs of the Pythagorean theorem.