

MATH 1300, Mathematical Explorations

Arguments and Reasoning

“In mathematics, there is the concept of proving something; of knowing it with absolute certainty, which is called rigorous proof. Rigorous proof is a series of arguments based on logical deductions which build one upon the other, step-by-step until you get to a complete proof. That’s what mathematics is about.” —Simon Singh

Assignments

1. Do Investigation 5 from Chapter 4 of the [Reasoning](#) book. Write down all questions and answers, and the rule the creator had. Now write three more rules that would fit the questions and answers. What does this tell you about reasoning from limited data? Think of questions you could have asked to rule out the other three rules. Now think of another rule that would fit all of the data with the answers to those three new questions, but is STILL not the rule the creator constructed.
2. Read (on Wikipedia or elsewhere) about the “New Riddle of Induction”, and specifically about the idea of “grue.” What do you think about it? What does it tell you about the scientific method? (You may want to look at the Wikipedia article on the scientific method, especially the example they give about DNA.)
3. Do (and turn in) Investigations 40-42 in Chapter 4. Did you notice a difference in how you were thinking about the problem than when you were playing What’s my World?
4. Do and turn in the Sudoku puzzle on page 67. (You may want to look at Investigations 43-52 for help.) In the Sudoku puzzle, just like in What’s my World, you are working with figuring out the state of the world from a limited amount of information. How is your thinking different? Which results are you more confident of?

References and resources

[The Art of Mathematics: Truth, Reasoning, Certainty, and Proof](#)

[Wikipedia: The New Riddle of Induction](#)

[Wikipedia: Scientific Method](#)