

M316K – Foundations of Arithmetic
Spring 2009
Problem Set 2 – Due Friday, February 6

“Euclid taught me that without assumptions there is no proof. Therefore, in any argument, examine the assumptions.” – Eric Temple Bell



Since you only have about a week to complete this problem set, this problem set is a bit shorter than the previous one. Furthermore, I hope you’ll find that the first few problems are fairly routine once you’ve read the latter half of Chapter 1. Still, be sure to start working early! If you get caught trying to do the entire problem set in one evening, you’ll probably get frustrated and find yourself unable to finish.

Section 1.7: 7*, 8*, 9*, 10*, 11, 12, 16, 26, 31, 33.

Note that these exercises are **not** the Chapter 1 Review Exercises. Be sure you’re working the right problems before you get started.

In Problems 7 through 10, you’ll find that answers to some parts of each problem are given in the back of the book. You don’t have to write your answers to the parts whose answers are given in the back of the book. Instead, I recommend that you write your answers to these parts on scratch paper for practice and then use the back of the book to check your work before you do the ones whose answers are not given.

Bonus Problems

- B1.** In Problems 9 and 10 in the Section 1.7 exercises, you encountered some invalid arguments, also called *fallacies*. Most of the invalid arguments in these problems are the result of “assuming the converse” of a true statement. (An example of the “assuming the converse” fallacy is assuming that if we multiply two numbers and get a whole number, then the two numbers we multiplied must have been whole numbers. Another example, from my life, is a friend of mine – a math teacher, no less! – who, when I admonished him for buying lottery tickets, justified his choice by saying “you can’t win if you don’t play.”) One of the best places in the world to find “assuming the converse” fallacies is – you guessed it – arguments on online message boards. Find an argument on a message board where a user commits an “assuming the converse” fallacy, give me a web address where I can find the comment, paraphrase the comment, and explain why the argument you found is invalid and why it constitutes an “assuming the converse” fallacy.
- B2.** In the attached puzzle, form a single closed loop by drawing horizontal and vertical edges between the vertices in the picture. The loop must satisfy the following conditions:
1. It must be a single closed loop, with no branches or crossings.
 2. If a square of the grid contains a number, then that square must be surrounded by the number of edges indicated. (In other words, a square with a “0” must not have any of its edges colored in; a square with a “2” must have exactly two of its edges colored in.)
- B3.** Discuss any strategies you discovered while working on this puzzle. (You may do this even if you are not able to complete the puzzle.)