Mathematics 2200H – Mathematical Reasoning

TRENT UNIVERSITY, Fall 2016

Assignment #2

Knights and Knaves

Due on Thursday, 22 September.

A very special island is inhabited only by knights and knaves. Knights always tell the truth, and knaves always lie.

You meet seven inhabitants: Mel, Joe, Zed, Bart, Marge, Bozo and Carl. Mel claims, "Bart is a knight and Bozo is a knave." Joe claims that only a knave would say that Marge is a knave. Zed claims that at least one of the following is true: that Bart is a knight or that Bozo is a knave. Bart says that both Mel is a knight and Zed is a knave. Marge tells you, "Mel is a knave." Bozo tells you that Carl is a knave. Carl says, "Bozo is a knave or Bart is a knave."

Can you determine who is a knight and who is a knave?[†]

1. Determine, as best you can, which of the seven inhabitants is a Knight and which is a Knave. *[10]*

NOTE: Do make sure to provide as complete and coherent reasoning as you can as part of your answers to both problems above!

A logic limerick, just for fun:

Deduction Theorem

A Theorem fine is Deduction,
For it allows work-reduction:
To show "A implies B",
Assume A and prove B;
Quite often a simpler production.

[†] This is puzzle #270 out of 382 from a collection of knights and knaves puzzles at: `philosophy.hku.hk/think/logic/knights.php`