MATH 3040: CLASS ASSIGNMENT (FEB. 12)

Read *The Art of Proof* [TAP], Chapter 2.2–2.3, if you have not done so already. Use these as a model to prepare your proofs on the Induction sheet, up to at least Exercise 5.

In addition, prepare three "natural language" negations of the statement

"For all real numbers x, there exists a unique y such that 2x = y."

by translating the statement into symbols, choosing different places to put ("¬") and then translating that statement back into natural language. In particular, remember that "∃!" is expressed as a conjunction, so you'll need to use De Morgan's law to get the correct negation of "∃!". Put these on a separate piece of paper to turn in, and circle the one that you think is easiest to check, with your justification as to why.

For example, the statement

"If an animal has 12 legs, then it is green"

can be expressed in logical symbols as "$\forall$(12-legged animals)$x, G(x)$," where $G(x)$ is the statement "x is green," and has natural language negations "Not all 12-legged animals are green" ("$\neg(\forall x, G(x))$") and "There exists a 12-legged animal that is not green" ("$\exists x, \neg G(x)$")