

# HW 1.3

8. Note that part (b) and part (c) are not the sorts of things one would normally say.
- a) If an animal is a rabbit, then that animal hops. (Alternatively, every rabbit hops.)
  - b) Every animal is a rabbit and hops.
  - c) There exists an animal such that if it is a rabbit, then it hops. (Note that this is trivially true, satisfied, for example, by lions, so it is not the sort of thing one would say.)
  - d) There exists an animal that is a rabbit and hops. (Alternatively, some rabbits hop. Alternatively, some hopping animals are rabbits.)

36. a) Some system is open.      b) Every system is either malfunctioning or in a diagnostic state.
- c) Some system is open, or some system is in a diagnostic state.      d) Some system is unavailable.
  - e) No system is working. (We could also say "Every system is not working," as long as we understood that this is different from "Not every system is working.")

48. a) This is false, since there are many values of  $x$  that make  $x > 1$  true.
- b) This is false, since there are two values of  $x$  that make  $x^2 = 1$  true.
  - c) This is true, since by algebra we see that the unique solution to the equation is  $x = 3$ .
  - d) This is false, since there are no values of  $x$  that make  $x = x + 1$  true.