# Question 1

* Each letter counts as one symbol
* Assume the most compact representation
* Examples: VIII is 4, MMMMMMMI is 8
* The bar adds one symbol

**Question 2**

* Choose a base for the log first (choose base 2)
* Then plug-in small values for
* Arrive at a small constant positive integer for which
* Then prove by induction on
* Choose a base for the log and guess a
* Along the way, use tricks such as exponentiating with to get rid of nasty terms

**Question 3**

* First adopt case-analysis (tackle each case one at a time)
* Use logical deduction for every case?
* More specifically, prove equality () in two parts: and
* For example, prove by proving and
* Example: Prove the case that both are even:
  + Let
  + Then, divides both and
  + Therefore, divides both and
  + Therefore,
  + Then proceed to prove
* To identify what is, first look at what input(s) the algorithm in question takes
  + And that is a pair of non-negative integers
* So, to encode (i.e., write down these two numbers), it would take symbols, which is the same as , so this is our

**Question 5**

* We can infer things based on properties of mod
* E.g., since:
* Then we know that: