Quiz 2

1. Define the following. Your definition must be mathematically precise.

   (a) Let A and B be sets (not necessarily finite). Then $|A| = |B|$ if

   (b) $\Theta(f) = \{g : \mathsf{N} \to \mathsf{R} :$

   $\}$

2. Complete the following:

   Theorem (Pigeon-hole principle) Let $f : A \to B$ be a function, where A and B are finite. Suppose that $|A| > |B|$. Then

3. Consider the function $f(x) = 2|x| + 1$, with domain R. Specify the range.

4. Answer the following TRUE or FALSE. *(Grading: correct is +5, incorrect is −5, no answer is 0)*

   (a) $3n^2 \lg n \in O(n^2)$

   (b) $500n + 10 \lg^2 n \in \Theta(n^2)$

   (c) There is a bijective function from R (the set of reals) to Q (the set of rationals)?

5. Let $L = \{x \in \{a, b\}^* : \ x \text{ has three (or more) consecutive } a\text{'s}\}$. Draw a DFA that accepts L.