

## CS581 Worksheet # 9

Due by midnight, Thursday, June 6th, Submit via D2L

1. For each  $g(n)$  listed below, write down an  $f(n)$  such that  $f(n) = O(g(n))$ 
  1.  $O(n)$
  2.  $O(N \log n)$
  3.  $O(n^3)$
2. For each function below, give an asymptotic upper bound (using Big O notation)
  1.  $F(n) = n(3n^3) + 4\log_2 n$
  2.  $F(n) = 1/n + n$
  3.  $F(n) = 2^n + 4n^6 + 3$
3. Is the following boolean formula satisfiable?
  1.  $(x \vee y) \wedge (x \vee (\text{not } y)) \wedge ((\text{not } x) \vee y) \wedge ((\text{not } x) \vee (\text{not } y))$
4. Argue that P is closed under union, concatenation, and complement
5. Outline two methods to show that a language is in NP
6. How might one show a language is NP-complete?