Assignment 6
Due: November 8, 9:30 am

1. (4 points) Determine whether each of the following functions is $O(x^2)$

   a. $f(x)=1000x+1428$

   b. $f(x)=0.01(x^3+x+1)$

   c. $f(x)=2^x$

   d. $f(x)=\lceil x+3 \rceil \cdot \lfloor x/2 \rfloor$

2. (4 points) Let $f(x)= (x^4+x)/(x^2-2x-1)$ and $g(x)= x^3$. Show that $f(x)$ is $O(g(x))$, but $g(x)$ is not $O(f(x))$.

3. (4 points) Give a good big-O estimate of the following functions. For the function g in your estimate $f(x)$ is $O(g)$, use a simple function g of smallest order.

   a. $(n^2+n\log n)(2n+7)$

   b. $(n^n+n2^n+5^n)(n!+5^n)$

4. (2 points) Show that $3x+7$ is $\Theta(x)$.