Write your name and code on the back.

# Show your work!

**1.** { 6 points } **Give a big-$O$ estimate for each of these functions. For the function $g(n)$ in your estimate that $f(n)$ is $O(g)$, use a simple function $g$ of the smallest order.**

**(a)** $f(n) = n\log(n^4 + 1) + \frac{n^2}{\log n}$

**(b)** $f(n) = (n\log n + n)^2 + \frac{2^n}{n!}$

**2.** { 4 points } **Show that**

$$\lceil 2x^2 - x \rceil = \Theta(x^2)$$