CS 3343 (Fall 2007) Assignment 1 Solutions(Kwek)

September 8, 2007

1.

$$\{\lg n^2, \lg n\}, 100n^2 + n, n^3 - n^2, 2^n, 3^n, n!$$

2.

$$lim_{n\to\infty}\frac{(n^2+1)^{10}}{n^{20}} = lim_{n\to\infty}\left(\frac{n^2+1}{n^2}\right)^{10} = lim_{n\to\infty}\left(1+\frac{1}{n^2}\right)^{10} = 1$$

Therefore, $f(n) = \Theta(g(n))$.

3. Here, want to show $100n \leq cn^3$ for some c, n_0 and $\forall n > n_0$.
Set $c = 1$, we want $100n \leq n^3 \Leftrightarrow 100 \leq n^2$ which is true for $n \geq 10$.