Chapter 0 Exercises

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0.1 (a) *Proof.* Given the functions $f(n) = n^2$ and $g(n) = 2n^2 + 100\sqrt{n}$ we may observe that $f = o(g)$. This follows from the fact that $n^2 < 2n^2$ for all $n \in \mathbb{N}^+$. To prove this we simply use the definition of $f = o(g)$ if for every $\epsilon > 0, f(n) \leq \epsilon \cdot g(n)$ for every sufficiently large n. From the equation we can observe that $\epsilon = 2$ and that this is true for all $n \geq 1$. That is, $1^2 < 2 \cdot 1^2$ or $1 < 2$. Q.E.D.