

# 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.
- (b) *Proof.* Q.E.D.