Quickcheck 02: Solutions

Name:

Definition: Dominated by

A function $f(n)$ is dominated by $g(n)$ when...

- There exists two constants $c > 0$ and $n_0 > 0$...
- Such that for all values of $n \geq n_0$...
- $f(n) \leq c \cdot g(n)$ is true.

Demonstrate that $2n^3 - 3 + 9n^2 + \sqrt{n}$ is dominated by n^3 by finding a c and n_0. Show your work.

Solution:

Note that:

$$\begin{aligned} 2n^3 - 3 + 9n^2 + \sqrt{n} &\leq 2n^3 + 9n^2 + n && \text{for all } n \geq 1 \\ &\leq 2n^3 + 9n^3 + n^3 && \text{for all } n \geq 1 \\ &= 12n^3 \end{aligned}$$

So, one possible choice of n_0 and c is $n_0 = 1$ and $c = 12$.