1 Definitions

Which of the following is the correct English description of f(n) = O(g(n))?

O For every constant c > 0, there is an n_0 , such that for all $n \ge n_0$, we have $f(n) \le c \cdot g(n)$.

• There is some c > 0 and some n_0 , such that for all $n \ge n_0$ we have $f(n) \le c \cdot g(n)$.

O For every n_0 , there is some constant c > 0 such that for all $n \ge n_0$ we have $f(n) \le c \cdot g(n)$.

Correct

Suppose that g(n) > 0 for all integers *n*. Then is f(n) = O(g(n)) equivalent to the following simpler definition that avoids n_0 ? Note the implicit assumption that f(n) and g(n) are functions over nonnegative integers.

$$\exists c > 0 : \forall n f(n) \leq c \cdot g(n)$$

YesNo

Correct

Suppose that f(n) = O(g(n)). Which of the following is implied by this fact? • $g(n) = \Omega(f(n))$ • g(n) = O(f(n))• Both • Neither • Correct

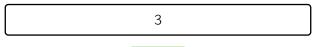
If f(n) = O(g(n)), is it true that $2^{f(n)} = O(2^{g(n)})$? • Yes • No

Correct

2 Examples

What is the smallest exponent x such that

$$n^2 + n^3 - n = O(n^x)?$$



Correct

Which of the following describes n(n+1)(n+2)/6?

- $O O(n^4)$
- $O O(n^3)$
- $O \Theta(n^3)$
- $O \Omega(n^2)$

• All of the above

Correct

For which exponents x is $n(n+1)/2 = \Theta(n^x)$? O 1

O 2

O 3

O All of the above

Correct

For which function g(n) is it true that $n^2 = O(g(n))$? • $g(n) = 1.01^n$ • $g(n) = 2^n \cdot \sin(\pi n/2)$ • $g(n) = 2^n \cdot \cos(\pi n/2)$ • All of the above

Correct