The notation O(g(n)) denotes a set of functions. Therefore, we write

f(n) is in O(g(n)) or f(n) ∈ O(g(n)).

But some books and research articles use the notation

f(n) = O(g(n))

Don’t ever do that! And, if you see a book or website using that notation, stop using to that book or website.

Using equality = instead of membership ∈ can lead to proving things that are false. Here’s an example.

We know that n+2 ∈ O(n) and n+3 ∈ O(n). Let’s write these as equalities instead:

(1) n+2 = O(n)  
(2) n+3 = O(n)

But transitivity of equality then allows us to conclude that

n+2 = n+3 and

2 = 3

Obviously these are false, but we proved them from equalities (1) and (2).

Therefore, never write: f(n) = O(g(n)).