1. If , then, by the formal definition of Big-Oh, this is only true when there exists positive constants c and such that for

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Therefore, if both of the above statements are true, then we can conclude that for

This final statement is the definition of Big-Theta, which only holds true if is both the lower bound (Big-Omega) and upper bound (Big-Oh) of , for some constants . If either of these statements were false, which they are not – as we have shown, then .

1. Let and . From this, it follows that there are constants and , both positive integers, such that and for all

It is inherently true that

It then follows that

, for and , which is the definition of Big-Omega, as shown below.