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CSIS 213-3941

Assignment 5&6 Quiz Part 2

**Question 4**

a is a real number that satisfies the following inequality:

floor(a) ≤ a – 1/2

Write a mathematical proof to show that the following equality is true:

floor(2a) = 2 floor(a) + 1

**Proof:**

Suppose *a* is a [particular but arbitrarily chosen] integer. By the definition of the floor of *a*, floor(2*a*) = 2 floor(*a*) + 1 is true. Thus,

floor(*a*) <= *a* – 1 / 2

floor(2*a*) <= 2*a* – 1

2*a* – 1 = 2 floor(*a*­­) + 1

2*a* = 2 floor(*a*)

Let *n* = floor(*a*) <> n <= a < n + 1

2*a* = 2*n*

*a* <= *n*

Therefore, floor(2*a*) = 2 floor(*a*) + 1 by the definition of the floor of *a.*