

Quiz 1

Please, write clearly, justify all your steps and use proper notation to receive credit for your work.

(1) Use induction to prove that, for any $n \in \mathbb{N}$, the number $5^n - 3^n$ is divisible by 2.

(2) Let R be the relation on \mathbb{Z} defined as follows:

For $a, b \in \mathbb{Z}$, aRb if and only if a is a multiple of b

- (a) Is R reflexive?
- (b) Is R symmetric?
- (c) Is R transitive?
- (d) Is R an equivalence relation?

For each question, prove it or disprove it using a counterexample.