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Quiz over week 3 material

4/29/2014

1) Prove that there exists a positive integer m such that m2 = 2m.

I will prove this case by contradiction

Let p be the proposition "there exists a positive integer m such that m2 = 2m" To prove by contradiction, it must be shown that ¬p is false, to prove that p is true. Assume that ¬p is true, then we are saying that there does not exist a positive integer m such that m2 = 2m. But the positive integer 2 when plugged into this equation yields 22 = 2(2) which is indeed true. Because our assumption that ¬p being true is proven false, we have proved by contradiction that p is true, meaning there exists a positive integer m such that m2 = 2m.

2) Use proof by contradiction to show that for any selection of 3 distinct integers between 0 and 6 that at least one of those numbers will be odd.

Let p be the proposition "any selection of 3 distinct integers between 0 and 6 that at least one of those numbers will be odd." To prove by contradiction, assume that ¬p is true. That is, "there are no selection of 3 distinct integers between 0-6 that at least one of those numbers will be odd."

This is not true for the case of choosing integers, 1, 4, and 6.  This shows that ¬p is false, which asserts the fact that p is true.

I have proven by contradiction that any selection of 3 distinct integers between 0 and 6 has at least one odd number.

(note to instructor: the integers 2,4,6 would also prove the original statement wrong as well, so....)