Quiz Proof #3

September 16, 2015

Tools

You may call on these definitions and you may use the propositions below without having to prove them.

Definition 1. *An integer b is said to be* divisible *by another integer a (written $a \mid b$) if $b = ak$ for some integer k.*

Definition 2. *An integer $n > 1$ is called* prime *if it has only two positive divisors, namely 1 and n. An integer $n > 1$ is called* composite *if it is divisible by some integer b satisfying $1 < b < n$.*

Definition 3. *An integer n is called* even *if it is divisible by two. Otherwise it is called* odd*.*

Proposition 1. *If n is an even integer, then $n + 1$ is an odd integer.*

Proposition 2. *If n is an odd integer, then $n + 1$ is an even integer.*

Task

Theorem 1. *If p is a prime number greater than 2, then $p + 1$ is composite.*

Write a proof. This will involve several logical pieces, not just one. Please be careful to fully verify *all* the conditions of the definitions you use. *Hint: First show that p is odd. Then what do we know about $p + 1$?*