

1 Assignment

A number is *prime* if it is an integer greater than 1 which is divisible by no positive integers besides 1 and itself.

Example: The number 3 is prime because the only positive integers dividing it are 1 and 3. The number 12 is not prime, because it is divisible by 4, which is neither 1 nor 12.

Prove the following theorem.

Theorem 1. *The only even prime is 2.*

Hint: proof by contradiction.

Proof. Suppose there are two distinct even primes. Since 2 is an even prime, there is another, which we will call p . Then 2 divides p since p is even. But since $2 \neq p$ and $2 \neq 1$, this implies that p is divisible by something other than 1 and itself. Thus is not a prime, which is a contradiction. \square