Proving The Contrapositive

In the chapter: If … Then, we showed that $p \Rightarrow q$ is the same as $q' \Rightarrow p'$

So:

to prove $p \Rightarrow q$ we can prove $q' \Rightarrow p'$ instead.

Note:

$q' \Rightarrow p'$ is called the contrapositive of $p \Rightarrow q$

Theorem

n^2 is even $\Rightarrow$ n is even

We are going to prove:

n is odd $\Rightarrow$ n^2 is odd

Proof

n is odd $\Rightarrow$ $n = (2k+1)$ for some integer k

So:

$n^2 = (2k+1)^2 = 4k^2 + 4k + 1 = 2(2k^2 + 2k) + 1$

So:

n^2 is odd

End of proof