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## Homework 2

Let  $n$  be an odd number. Prove that  $3n$  is odd

Contradiction  $\therefore$  Negate the statement you are trying to prove and then look for a contradiction  
 Here we are trying to prove that  $3n$  is odd so we have to negate that  $3n$  is not odd

Statement	Reason
Let $n$ be odd	Given
Contradiction: $3n$ is even So $2 \mid 3n$ $2k = 3n$ - this is what we are trying to prove. $\exists k$ when multiplied by 2 gives us $3n$ & $n \in \text{odd}$	By defn of even
$3n = 2k \quad k \in \mathbb{Z}$	By defn of even & commutative nature
So $n$ has $2 \mid n \rightarrow$ Since $n$ is odd $2 \nmid n$	By defn of even
Now Back track Since $2 \nmid n$ . $3n \neq 2k$	

py: Let  $n$  be an odd number s.t.  $3n \in \text{Odd}$   
By contradiction  $3n \in \text{Even}$  s.t.  $2k = 3n$  s.t.  
 $2 \mid n$ . Since  $2 \nmid n$   $3n \neq 2k$  implying that  
 $3n$  is not even hence Odd