# REAL NUMBERS

## SOLUTION 1

**Prove that the product of two consecutive positive integers is divisible by 2.**

**Solution:**

Let $(n-1)$ and $n$ be two positive integers.

Their product $n(n-1) = n^2 - n$

Any positive integer is of the form $2q$ or $2q+1$, for some integer $q$.

The following cases arise:

**Case 1**

When $n = 2q$

$n^2 - n = (2q)^2 - 2q = 4q^2 - 2q = 2q(2q-1)$

$n^2 - n = 2m$, where $m = q(2q-1)$

$\therefore n^2 - n$ is divisible by 2.

**Case 2**

When $n = 2q + 1$

$n^2 - n = (2q+1)^2 - (2q+1) = (2q+1)(2q+1-1) = 2q(2q+1)$

$n^2 - n = 2m$, where $m = q(2q+1)$

$\therefore n^2 - n$ is divisible by 2.

Hence, $n^2 - n$ is divisible by 2 for every positive integer $n$.

$(n-1)n$ is divisible by 2.

$\therefore$ The product of two consecutive positive integers is divisible by 2.