

Type 2: Divisibility Proofs

There are different techniques for the inductive step. For the following example we will consider 2 different methods.

Example

Prove by induction that $3^{2n} + 11$ is divisible by 4 for all positive integers n .

Basis step:

Assumption:

Inductive step: method 1

Inductive step: method 2

Conclusion:

Example:

Prove by induction that $8^n - 3^n$ is divisible by 5.

Question:

Prove by induction that $n^3 - 7n + 9$ is divisible by 3 for all positive integers n .