

## Chapter 2: Writing Proofs About Numbers

Section 2.1 and 2.2: Introduction to Proofs

Examples of claims and proving claims for specific cases.

1. If  $n$  is odd, then  $n^2 + 4$  is a prime number for  $n \geq 1$ .

2. If  $n$  is odd, then  $n^3 - n$  is evenly divisible by 4 for  $n \geq 1$ .

If all specific cases are true, then a proof for the general case can be written. If a counterexample is found for a claim, the claim cannot be proven.

To prove a statement for the general case

1. Pick values for  $n$  to test the hypothesis.
2. If all cases for  $n$  are true, a proof for the general case can be written.

Basic definitions used for proofs (part I)

1. An integer  $n$  is **EVEN**

2. An integer  $n$  is **ODD**

3. An integer  $n$  is **DIVISIBLE BY 4**

Prove the following (if possible).

1. The sum of an odd integer with an even integer is odd.

2. If  $n$  is even, then  $n^2$  is divisible by 4.