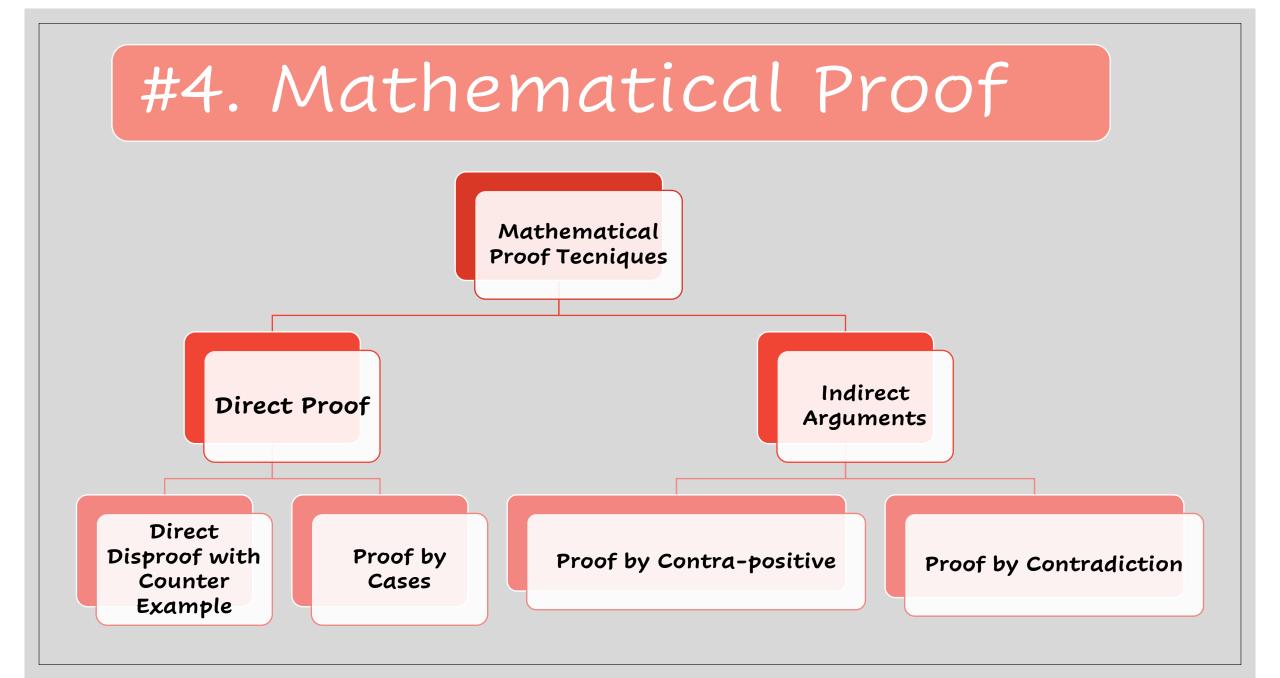


MAT 203E DISCRETE MATH

Instructor: Dr. Sümeyra BEDİR

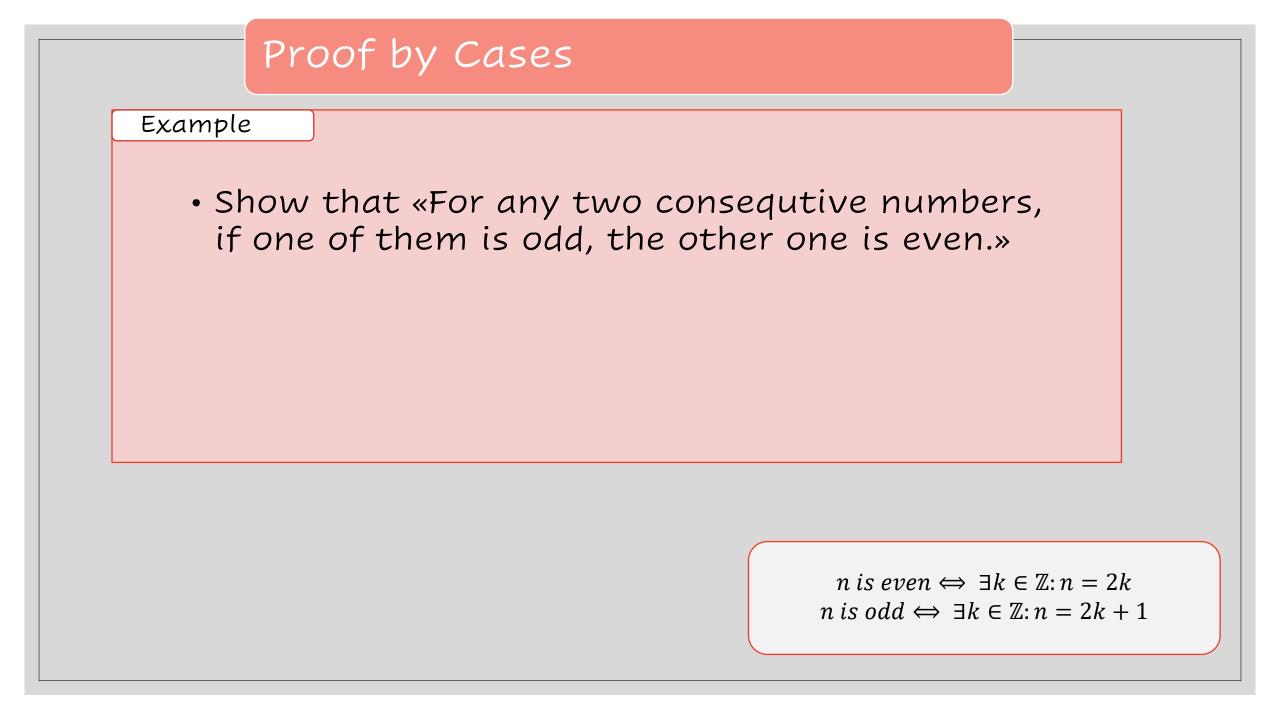


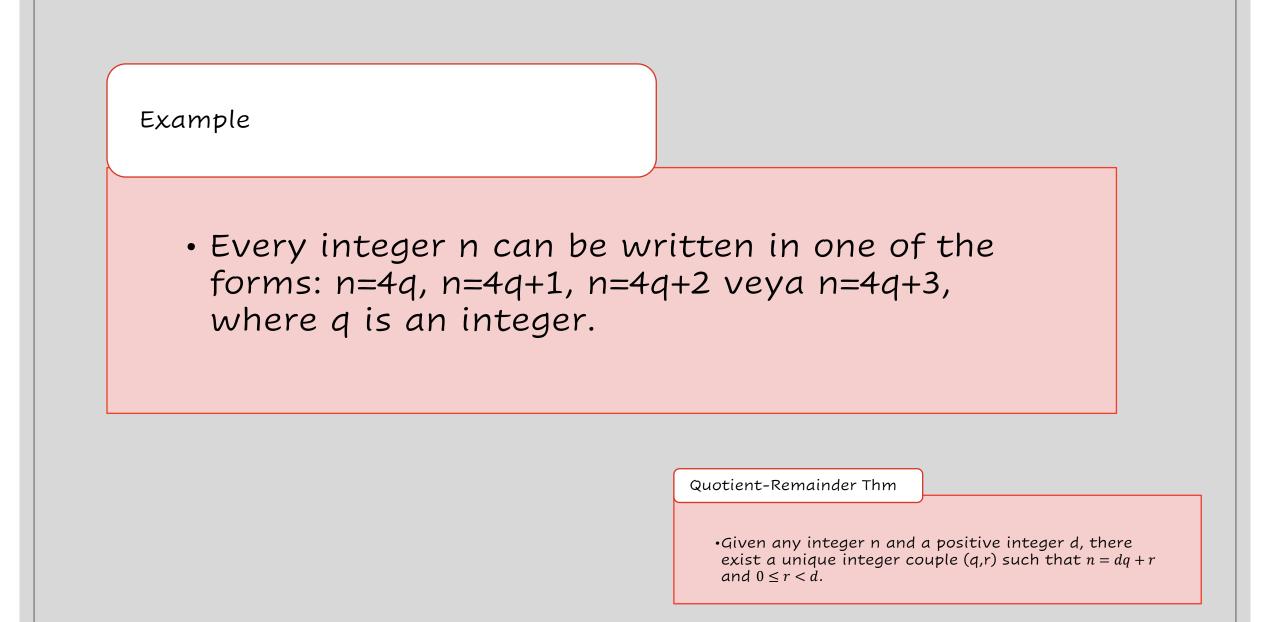
Direct Proofs (Proof by Cases)

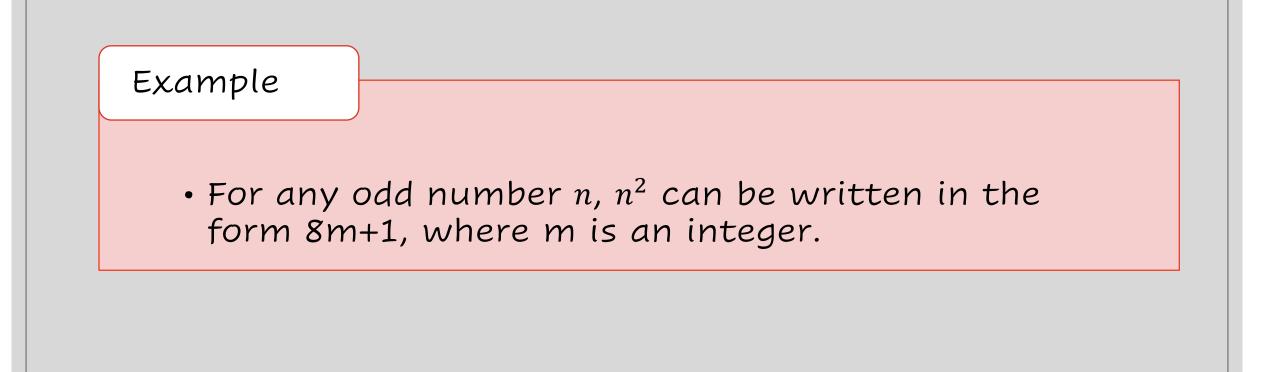
Theorem 4.4.1 The Quotient-Remainder Theorem

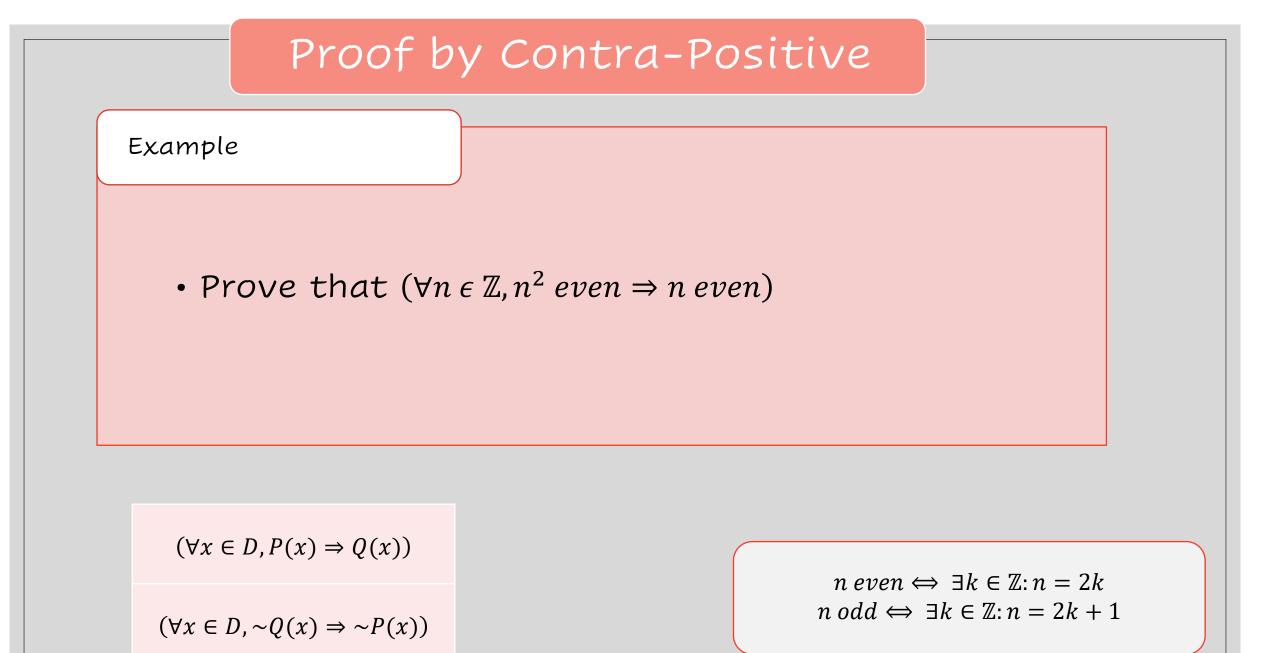
Given any integer n and positive integer d, there exist unique integers q and r such that

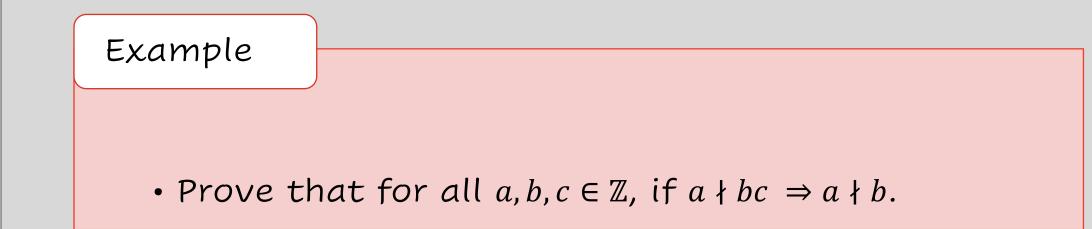
$$n = dq + r$$
 and $0 \le r < d$.

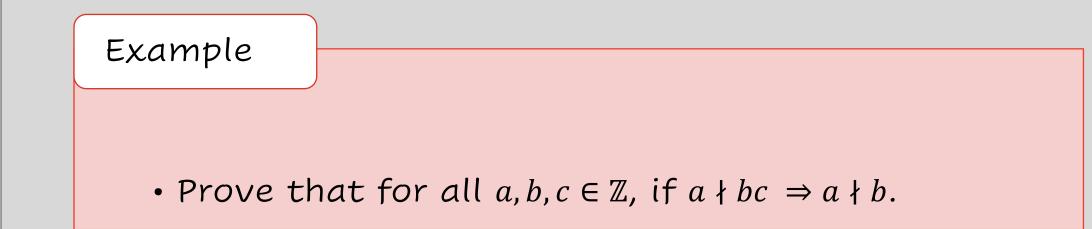












Proof by Contradiction

- 1. Assume the negation of the statement.
- 2. Try to reach to a contradiction.
- 3. The negation led to a contradiction means the original statement is true.

When to use contradiction?

- To show that there is no element in the domain that satisfies a given condition/property.
- To show that an element does not satisfy a given condition/property.

Example

• Show that the sum of a rational number and an irrational number is an irrational number.

Example

• Show that there is no integer which is both even an odd.