"Every even number greater than 2 can be written as the sum of two prime numbers."

$$\forall n : (\text{even } \#'s > 2). \; \exists p, q : Prime. \; p + q = n$$

$\equiv$

$$\forall n : (\text{even } \#'s > 2). \; \exists p : Prime. \; \exists q : Prime. \; p + q = n.$$
$$\forall n : \mathbb{N}. \; (Even(n) \wedge n > 2) \longrightarrow \exists p : Prime. \; \exists q : Prime. \; p + q = n.$$

Goldbach Conjecture

Intro to proofs.

A proof is a logically valid argument that establishes the truth of a proposition.

This can look like many different things depending on audience, subject, etc.   Form of communication.

We distinguish two types of proofs (continuum):

- Formal proof:
    - Use only axioms and things previously proved.
    - Consists of a series of steps where each step is a valid logical inference from previous steps or assumptions.
    - Is often expressed in formal notation.
- Informal proof:
    - Uses only axioms and things previously proved.
    - May omit or combine steps.
    - Is often expressed in natural language.
    - In principle could be expanded / translated into a completely formal proof.