Proof Methods Showcase

Me

November 14, 2019

1 Direct Proof

Replace this text with a few sentences describing the process for this type of proof and when you might use this method. (Reviewing Section 3.6 can help.)

Theorem. *Replace this text with the theorem statement.*

Proof. Write your proof here. □

2 Proof by Contrapositive

Replace this text with a few sentences describing the process for this type of proof and when you might use this method. (Reviewing Section 3.6 can help.)

Theorem. *Replace this text with the theorem statement.*

Proof. Write your proof here. □

3 Proof by Contradiction

Replace this text with a few sentences describing the process for this type of proof and when you might use this method. (Reviewing Section 3.6 can help.)

Theorem. *Replace this text with the theorem statement.*

Proof. Write your proof here. □

4 Proof by Mathematical Induction

Replace this text with a few sentences describing the process for this type of proof and when you might use this method.

Theorem. *Replace this text with the theorem statement.*

Proof. Write your proof here. □

Some LaTeX Commands

Here are some example sentences using LaTeX commands:
If $a \equiv 2 \pmod 3$, then $a^2 \equiv 1 \pmod 3$.
If x and y are positive real numbers, the arithmetic mean is $\frac{x+y}{2}$ and the geometric mean is $\sqrt{xy}$.
The union of two sets is $A \cup B$ and the intersection of two sets is $A \cap B$.
Let $(x, y) \in A \times B$.
Let $f : \mathbb{R} \to \mathbb{R}$ be defined by $f(x) = x^{2019}$.
In set-builder notation, the set of all odd integers is $\{2k+1 \mid k \in \mathbb{Z}\}$.
Suppose that

$$1 + 3 + 5 + \cdots + (2k-1) = k^2.$$

Note that if $a = 2k$, then

$$\begin{aligned} a^2 + 3a + 5 &= (2k)^2 + 3(2k) + 5 \\ &= 4k^2 + 6k + 4 + 1 \\ &= 2(2k^2 + 3k + 2) + 1. \end{aligned}$$

If $g \circ f$ is surjective, then g is surjective.
Note that $\mathbb{N} \subseteq \mathbb{Z} \subseteq \mathbb{Q} \subseteq \mathbb{R} \subseteq \mathbb{C}$.