Types of proofs	Want to show	How to show it
Direct proof	$p \rightarrow q$	Assume p is true. Derive a chain of implications which in the end proves that q is true.
Indirect proof (Proof by contrapositive)	$p \rightarrow q$	Prove $\neg q \rightarrow \neg p$ with direct proof
Proof by contradiction	p	Show $\neg p \rightarrow$ F
	$p \rightarrow q$	Show $p \wedge \neg q \rightarrow$ F
Proof by cases	$(p_1 \vee p_2 \vee \ldots \vee p_n) \rightarrow q$	Show $\underbrace{(p_1 \rightarrow q)}_{\text{case 1}} \wedge (p_2 \rightarrow q) \wedge \ldots \wedge (p_n \rightarrow q)$
Proof of equivalence	$p \leftrightarrow q$	Show $(p \rightarrow q) \wedge (q \rightarrow p)$
	$p \leftrightarrow q \leftrightarrow r$	Show $(p \rightarrow q) \wedge (q \rightarrow r) \wedge (r \rightarrow p)$
For-all proof	$\forall x: P(x)$	Prove $P(x)$ for an arbitrary x
		Induction
Counterexample	$\neg \forall x: P(x)$	Find x for which $P(x)$ is false
Existence proof	$\exists x: P(x)$	**Constructive:** Find x such that $P(x)$ is true.
		Non-constructive: Show that $P(x)$ is true for some x without finding it.