Chapter 4 roadmap:

- Subset proofs (day)
- Set equality and emptiness proofs (Wednesday)
- Conditional and biconditional proofs (Today)
- Proofs about powersets (next week Monday)
- Review for Test 2 (next week Wednesday)
- Test 2, on Chapters 3 & 4 (next week Friday, Oct 18)

Today:

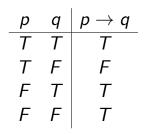
- Proofs of conditional propositions
- Proofs about numbers
- Proofs of biconditional propositions

General forms:

- 1. Facts (p) Set forms
 - 1. Subset $X \subseteq Y$
 - 2. Set equality X = Y
 - 3. Set emptiness $X = \emptyset$
- 2. Conditionals $(p \rightarrow q)$
- 3. Biconditionals $(p \leftrightarrow q)$

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To prove $p \rightarrow q$ Suppose p \dots q $p \rightarrow q$

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An integer x is even if $\exists k \in \mathbb{Z} \mid x = 2k$. An integer x is odd if $\exists k \in \mathbb{Z} \mid x = 2k + 1$.

"Axiom 3." If $x, y \in \mathbb{Z}$, then $x + y \in \mathbb{Z}$. (*Closure of addition*) "Axiom 4." If $x, y \in \mathbb{Z}$, then $x \cdot y \in \mathbb{Z}$. (*Closure of multiplication*) "Axiom 5." If $x \in \mathbb{Z}$, then x is even iff x is not odd.

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$$\forall x, y \in \mathbb{Z}, x \mid y \text{ (read, "x divides y") if } \exists k \in \mathbb{Z} \mid x \cdot k = y.$$

Note that $y/x = k \text{ or } \frac{y}{x} = k \text{ or } \frac{k}{x \mid y}.$

For next time:

Pg 162: 4.4.(1, 4, 5) Pg 164: 4.5.(2 & 5)

Review 1.8, especially Ex 1.8.14 Skim 4.7

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Take quiz