

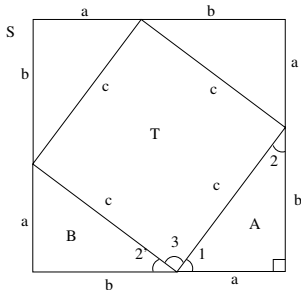
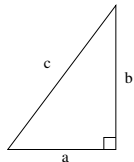
## Chapter 4 roadmap:

- ▶ Subset proofs (**Today**)
- ▶ Set equality and emptiness proofs (Wednesday)
- ▶ Conditional and biconditional proofs (Friday)
- ▶ Proofs about powersets (new week Wednesday)
- ▶ From theorems to algorithms (next week Friday)

## Today:

- ▶ Transition point in course
- ▶ Game plan for Chapter 4
- ▶ Anatomy of a proof
- ▶ Proof examples

Project proposal due this Friday, Feb 17.



$\triangle A \cong \triangle B$

$$\angle 1 + \angle 2 = 90^\circ$$

$$\angle 1 + \angle 2' = 90^\circ$$

$$\angle 3 = 90^\circ$$

$T$  is a square

$$\text{Area of } T = c^2$$

$$\text{Area of } S = (a + b)^2$$

$$\text{Area of each } \triangle = \frac{ab}{2}$$

$$(a + b)^2 = c^2 + 4 \frac{ab}{2}$$

$$a^2 + 2ab + b^2 = c^2 + 2ab$$

$$\therefore c^2 = a^2 + b^2$$

SSS

$\triangle$  angles sum to  $180^\circ$

$\angle 2 \cong \angle 2'$

Supplementary  $\angle$ s

Equal sides,  $90^\circ \angle$ s

Area of  $\square$

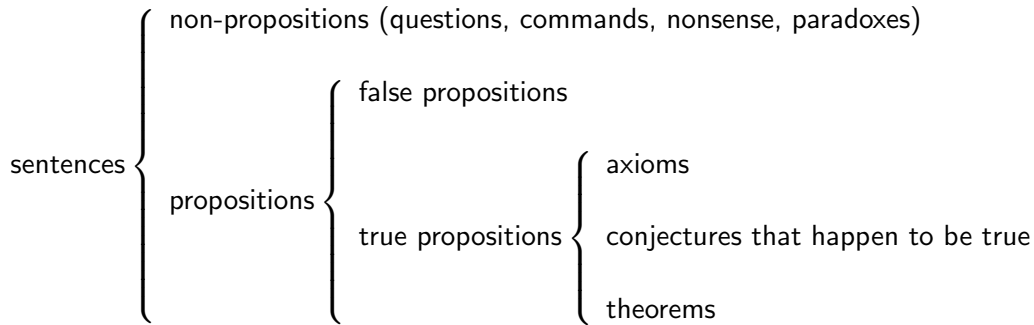
Area of  $\square$

Area of  $\triangle$

Sum of areas

Algebra (FOIL, simplification)

Subtract  $2ab$  from both sides.



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 ( $p \leftrightarrow q$ )

$$X \cup Y = \{z \mid z \in X \vee z \in Y\}$$

$$X - Y = \{z \mid z \in X \wedge z \notin Y\}$$

$$X \cap Y = \{z \mid z \in X \wedge z \in Y\}$$

$$X \times Y = \{(x, y) \mid x \in X \wedge y \in Y\}$$

$$\bar{X} = \{z \mid z \notin X\}$$

**For next time:**

*Pg 158:4.2.(2-7)*

*Review 4.(1 & 2)*

*Read 4.(3 & 4)*

*Take quiz*