

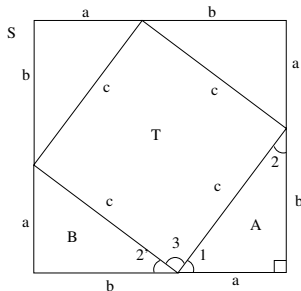
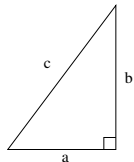
Chapter 4 roadmap:

- ▶ Subset proofs (**Today**)
- ▶ Set equality and emptiness proofs (Friday)
- ▶ Conditional and biconditional proofs (next week Monday)
- ▶ 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 Friday, Sept 30.



$$\triangle A \cong \triangle B$$

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

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

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

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°

$$\angle 2 \cong \angle 2'$$

Supplementary \angle s

Equal sides, 90° \angle s

Area of \square

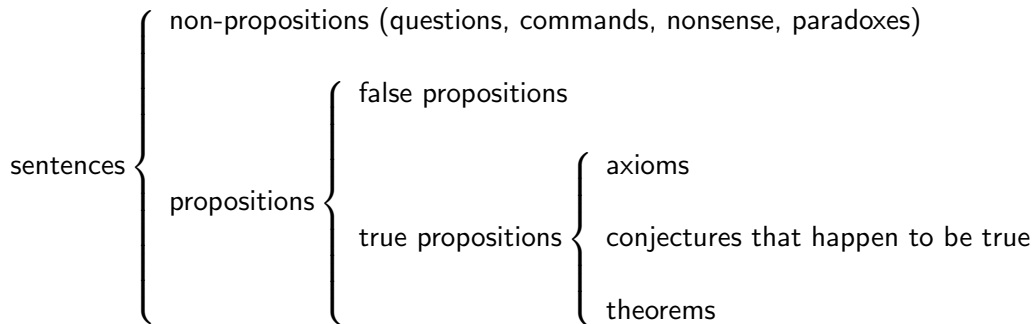
Area of \square

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 ($p \leftrightarrow q$)

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

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

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

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

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

For next time:

Pg 158:4.2.(2-7)

Review 4.(1 & 2)

Read 4.(3 & 4)

Take quiz