

# High school geometry theorems

Hilbert's axiomatic system.  
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**Theorem 1 (th\_13\_01.)** *Assuming that  $A \neq B$  and  $A \in p$  and  $B \in p$  and  $C \in p$  and  $\neg col(A, B, D)$  and  $\neg col(A, C, D)$  and  $A \in \alpha$  and  $B \in \alpha$  and  $D \in \alpha$  and  $A \in \beta$  and  $C \in \beta$  and  $D \in \beta$  it holds that  $\alpha = \beta$ .*

*Proof:*

1. From the facts  $A \neq B$  and  $A \in p$  and  $B \in p$  and  $A \in \alpha$  and  $B \in \alpha$  it holds that  $p \in \alpha$  (using *ax\_I6*).
2. From the facts  $p \in \alpha$  and  $C \in p$  it holds that  $C \in \alpha$  (using *ax\_D11*).
3. From the facts  $\neg col(A, C, D)$  and  $A \in \alpha$  and  $C \in \alpha$  and  $D \in \alpha$  and  $A \in \beta$  and  $C \in \beta$  and  $D \in \beta$  it holds that  $\alpha = \beta$  (using *ax\_I5*).
4. The conclusion follows from the fact  $\alpha = \beta$ .

QED

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