Lemma 18

Given $\triangle ABC, \triangle DEF$

$\overline{AB} \cong \overline{DE}$

$\angle ABC \cong \angle DEF$

$\angle BAC \cong \angle EDF$

To prove: there is an isometry f,

$f(A) = D \quad f(B) = E$

and $f(C) = F$

Proof: By Lemma 13, there exists isometry f such that

$f(A) = D$, $f(B) = E$

$f(C)$ is on same side of $\overleftrightarrow{DE}$ as F.

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by Lemma 17, because $\angle ABC \cong \angle DEF$

$f(C) \in \overrightarrow{EF}$.

* by Lemma 17, because $\angle BAC \cong \angle EDF$ (given) *

$f(C) \in \overrightarrow{DF}$

So $f(C) \in \overleftrightarrow{EF} \cap \overleftrightarrow{DF}$

2 distinct lines have at most 1 intersection (Thm 3)

and $F \in \overleftrightarrow{EF} \cap \overleftrightarrow{DF}$

so $f(C) = F$