Thm 18

Given: two angles have same measure

Proof: Let $m(\measuredangle ABC) = m(\measuredangle DEF)$

Other set up:
By Ax 3, there is an isometry, f, such that $f(B) = E$
$f(A) \in \overrightarrow{ED}$
and $f(C)$ is on the same side of $\overleftrightarrow{ED}$ as F.

Thm 18a

Given two angles w/ same measure and an isometry, f, such that...

Proof: Let $m(\measuredangle ABC) = m(\measuredangle DEF)$

and Let f be an isometry
such that $f(B) = E$
$f(A) \in \overrightarrow{ED}$
and $f(C)$ is on the same side of $\overleftrightarrow{ED}$ as F

Stuff that is the same

Let $f(A) = A'$, $f(B) = B'$, $f(C) = C'$.
Then either $C' \in$ inside of $\measuredangle DEF$, $C' \in$ outside of $\measuredangle DEF$ or $C' \in \overrightarrow{EF}$

case 1

[equations and algebra showing
$m\angle DEC' = 0$
$\times$]

case 2

[equations and algebra showing
$m\angle DEC' = 0$
$\times$]

case 3

so $C' \in \overrightarrow{EF}$

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

Therefore
$\measuredangle A'B'C' = \measuredangle DEF$
(2 names for same angle)
and $\measuredangle A'B'C' \cong \measuredangle ABC$

So $\angle A'B'C' \cong \angle DEF$