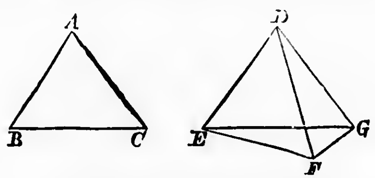
Proposition XXIV. Theorem.

If two triangles have two sides of the one equal to two sides of the other, each to each, but the angle contained by the two sides of one of them greater than the angle contained by the two sides equal to them of the other; the base of that which has the greater angle must be greater than the base of the other.



In the $\triangle$s ABC, DEF,
let $AB=DE$ and $AC=DF$,
and let $\angle BAC$ be greater than $\angle EDF$.
Then must BC be greater than EF.

Of the two sides DE, DF let DE be not greater than DF.*

At pt. D in st. line ED make $\angle EDG = \angle BAC$, I. 23.
and make $DG=AC$ or DF, and join EG, GF.

Then $\because AB=DE$, and $AC=DG$, and $\angle BAC = \angle EDG$,
$\therefore BC=EG$, I. 4.

Again, $\because DG=DF$,
$\therefore \angle DFG = \angle DGF$; I. A.
$\therefore \angle EFG$ is greater than $\angle DGF$;
much more then $\angle EFG$ is greater than $\angle EGF$;
$\therefore EG$ is greater than EF. I. 19.

But $EG=BC$;
$\therefore BC$ is greater than EF.

Q. E. D.

* This line was added by Simson to obviate a defect in Euclid's proof. *Without* this condition, three distinct cases must be discussed. *With* the condition, we can prove that F must lie below EG.

For since DF is not less than DE, and DG is drawn equal to DF, DG is not less than DE.

Hence by Prop. D, any line drawn from D to meet EG is less than DG, and therefore DF, being equal to DG, must extend beyond EG.

For another method of proving the Proposition, see p. 113.