

CONSTRUCTION.—1. Make BH equal to EF. (*Proposition 3, Book I.*)

2. Join AH.

DEMONSTRATION.—1. Because BH is equal to EF, (*Construction 1*), and AB equal to DE, (*Hypothesis*), the two sides AB, BH, are equal to the two sides DE, EF, each to each.

2. And the angle ABH is equal to the angle DEF. (*Hypothesis.*)

3. Therefore the base AH is equal to the base DF. (*Proposition 4, Book I.*)

4. And the triangle ABH to the triangle DEF. (*Proposition 4, Book I.*)

5. And the other angles to the other angles, each to each, to which the equal sides are opposite.

6. Therefore the angle BHA is equal to the angle EFD. (*Proposition 4, Book I.*)

7. But the angle EFD is equal to the angle BCA. (*Hypothesis 1.*)

8. Therefore the angle BHA is also equal to the angle BCA. (*Axiom 1.*)

9. That is, the exterior angle BHA of the triangle AHC, is equal to its interior and opposite angle BCA, which is impossible. (*Proposition 16, Book I.*)

10. Therefore BC is not unequal to EF; that is, BC is equal to EF; and AB is equal to DE. (*Hypothesis.*)

11. Therefore the two, AB, BC, are equal to the two, DE, EF, each to each.

12. And the angle ABC is equal to the angle DEF. (*Hypothesis 1.*)

13. Wherefore the base AC is equal to the base DF. (*Proposition 4, Book I.*)

14. And the third angle BAC is equal to the third angle EDF.

CONCLUSION.—Therefore if two triangles, &c. (*See Enunciation.*) Which was to be shewn.

PROPOSITION 27.—THEOREM.

If a straight line falling upon two other straight lines make the alternate angles equal to one another, these two straight lines shall be parallel.

HYPOTHESIS.—Let the straight line EF, which falls upon the two straight lines AB, CD, make the alternate angles AEF, EFD, equal to one another.