

2. It is not equal, because then the angle ABC would be equal to the angle BCA. (*Prop. 5, Book I.*)
 3. But the angle ABC is not equal to the angle BCA. (*Hypothesis.*)
 4. Therefore AC is not equal to AB.
 5. Neither is AC less than AB, because then the angle ABC would be less than the angle BCA. (*Prop. 18, Book I.*)
 6. But the angle ABC is not less than the angle BCA. (*Hypothesis.*)
 7. Therefore AC is not less than AB.
 8. And it has been shewn that AC is not equal to AB.
 9. Therefore AC must be greater than AB.
- CONCLUSION.—Wherefore the greater angle, &c. (*See Enunciation.*) Which was to be shewn.

PROPOSITION 20.—THEOREM.

Any two sides of a triangle, are together greater than the third side.

HYPOTHESIS.—Let ABC be any triangle.

SEQUENCE.—Any two sides of it together, shall be greater than the third side: viz., the sides BA, AC, greater than the side BC; and AB, BC, greater than AC; and BC, CA, greater than AB.

CONSTRUCTION.—1. Produce BA to the point D, and make AD equal to AC. (*Prop. 3, Book I.*)



2. Join DC.

DEMONSTRATION.—1. Because DA is equal to AC, the angle ADC is equal to the angle ACD. (*Prop. 5, Book I.*)

2. But the angle BCD is greater than the angle ACD. (*Axiom 9.*)

3. Therefore the angle BCD is greater than the angle ADC (or BDC.)

4. And because the angle BCD of the triangle DCB, is greater than its angle BDC, and that the greater angle is subtended by the greater side.

5. Therefore the side DB is greater than the side BC. (*Prop. 19, Book I.*)

6. But since AD is equal to AC. (*Construction 1.*)

7. The straight line BD is equal to BA and AC.