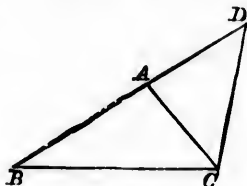


PROPOSITION XX. THEOREM.

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



Let ABC be a Δ .

Then any two of its sides must be together greater than the third side.

Produce BA to D , making $AD = AC$, and join DC .

Then

$$\therefore AD = AC,$$

$$\therefore \angle ACD = \angle ADC, \text{ that is, } \angle BDC.$$

I. A.

Now $\angle BCD$ is greater than $\angle ACD$;

$$\therefore \angle BCD \text{ is also greater than } \angle BDC;$$

$$\therefore BD \text{ is greater than } BC.$$

I. 19.

But $BD = BA$ and AD together;

that is, $BD = BA$ and AC together;

$$\therefore BA \text{ and } AC \text{ together are greater than } BC.$$

Similarly it may be shewn that

AB and BC together are greater than AC ,

and BC and CA AB .

Q. E. D.

Ex. 1. Prove that any three sides of a quadrilateral figure are together greater than the fourth side.

Ex. 2. Shew that any side of a triangle is greater than the difference between the other two sides.

Ex. 3. Prove that the sum of the distances of any point from the angular points of a quadrilateral is greater than half the perimeter of the quadrilateral.

Ex. 4. If one side of a triangle be bisected, the sum of the two other sides shall be more than double of the line joining the vertex and the point of bisection.

S. E.