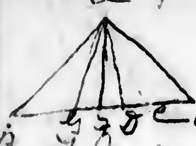
Book I page 54 (3) Let ABC be a △ AF the bisector of angle at A & AD the perpen from A on BC then ∠FAD = half diff of ∠s B & C.



At point A in st line FA make ∠FAG = ∠FAD I (23)

∠FAB = ∠FAC hyp.

∠FAG = ∠FAD Const

∴ rem angle GAB = rem ∠ DAC

∠B + ∠BAD = rt ∠ I 32

∠C + ∠CAD = " " I 32

∴ ∠B + ∠BAD = ∠C + ∠CAD ax I

∴ Diff between ∠B & ∠C = Diff ∠BAD & ∠CAD

= " ∠BAD & ∠GAB (since ∠GAB = ∠CAD)

= ∠GAD = 2 FAD (since ∠FAG = ∠FAD)

∴ ∠FAD = ½ diff between ∠B & ∠C

Props 5 & 6 in 2nd Book may be included in one enunciation:
The rectangle under the sum & diff of 2 st lines is equal to the diff of the sqq described on those st lines
or thus
The rectangle contained by 2 st lines together with the sq described on half their diff is equal to the sq described on half their sum

V

$$AD \cdot DC + \overline{CD}^2 = \overline{CB}^2$$
$$AD \cdot DB = \overline{CB}^2 - \overline{CD}^2$$
$$(AC + CD)(AC - CD) = \overline{AC}^2 - \overline{CD}^2$$

VI

$$AC \cdot CB + \overline{DB}^2 = \overline{DC}^2$$
$$AC \cdot CB = \overline{DC}^2 - \overline{DB}^2$$
$$(DC + AD)(DC - AD) = \overline{DC}^2 - \overline{AD}^2$$