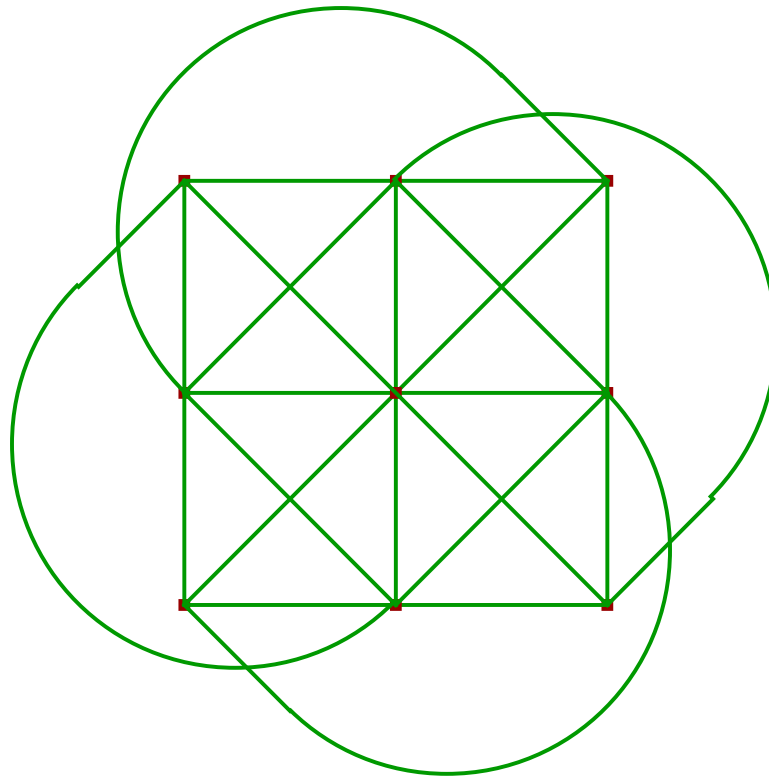


Graphiken zur Vorlesung

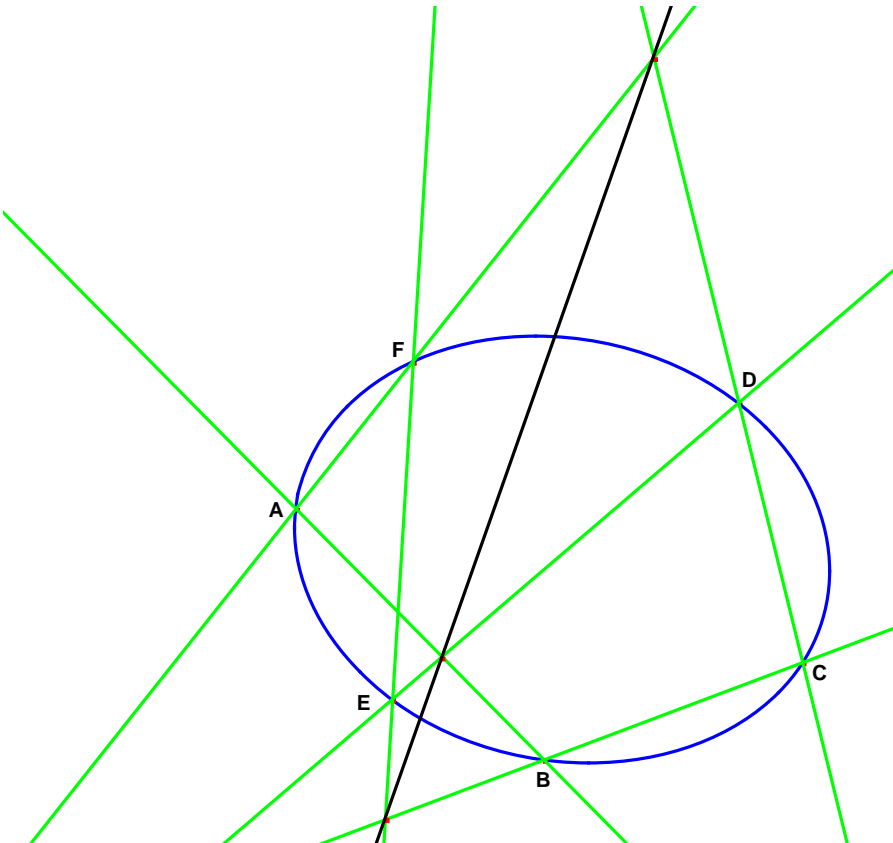
**Geometrie**

Wintersemester 2011/12

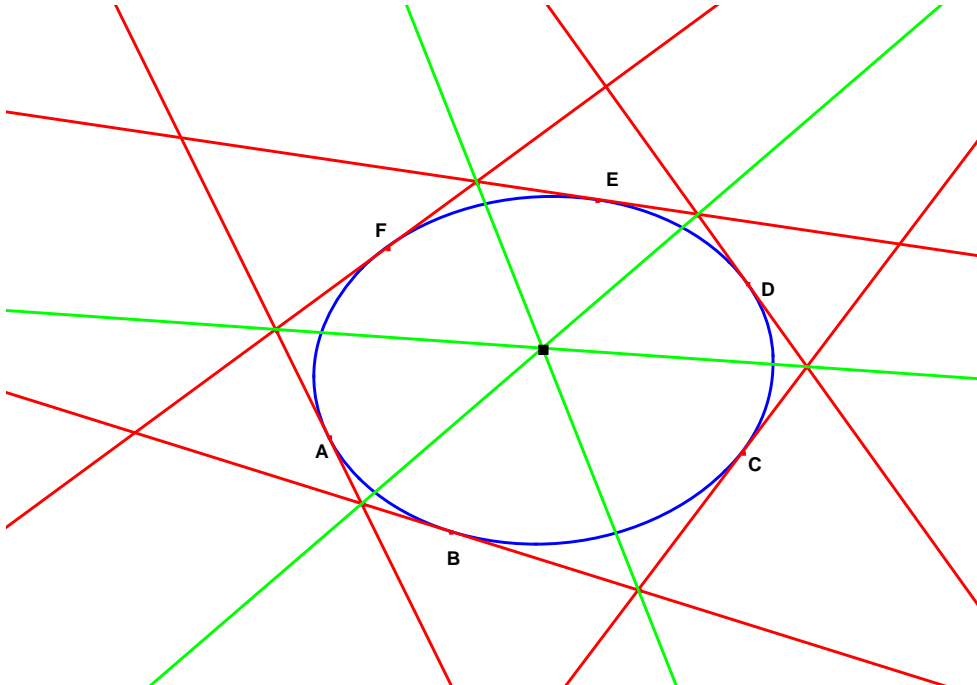
Affine Inzidenzebene der Ordnung 3



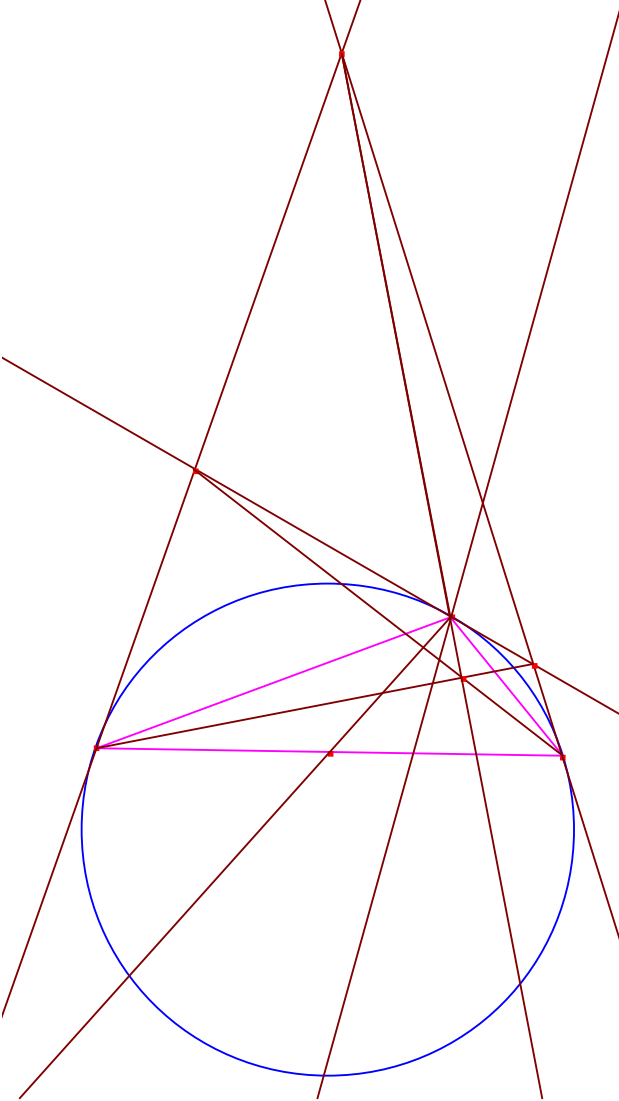
Satz von [Pappos-Pascal](#)



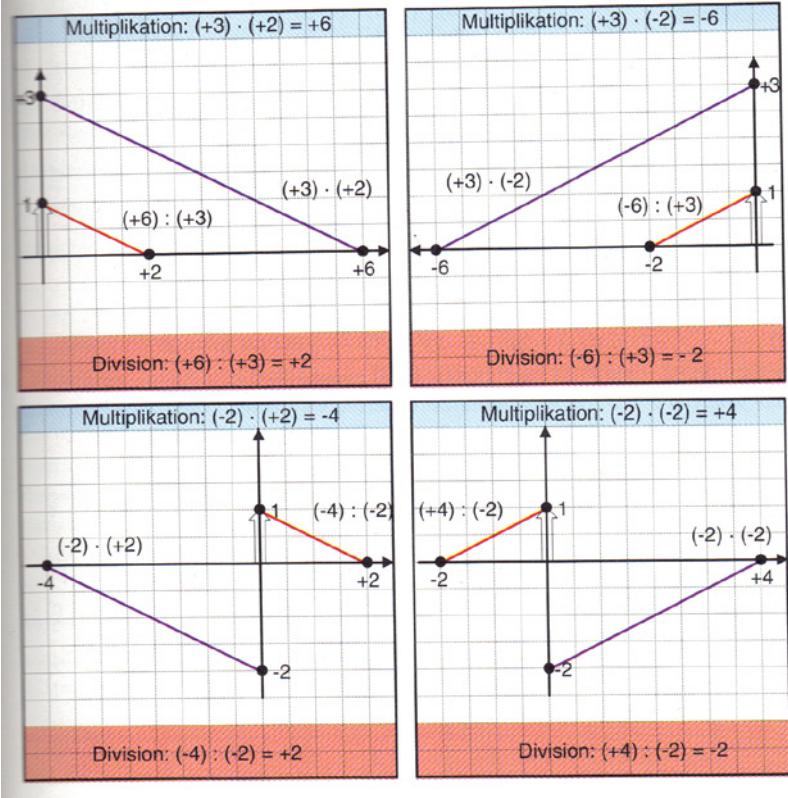
Satz von Pappos-[Brianchon](#)



Symmedianpunkt

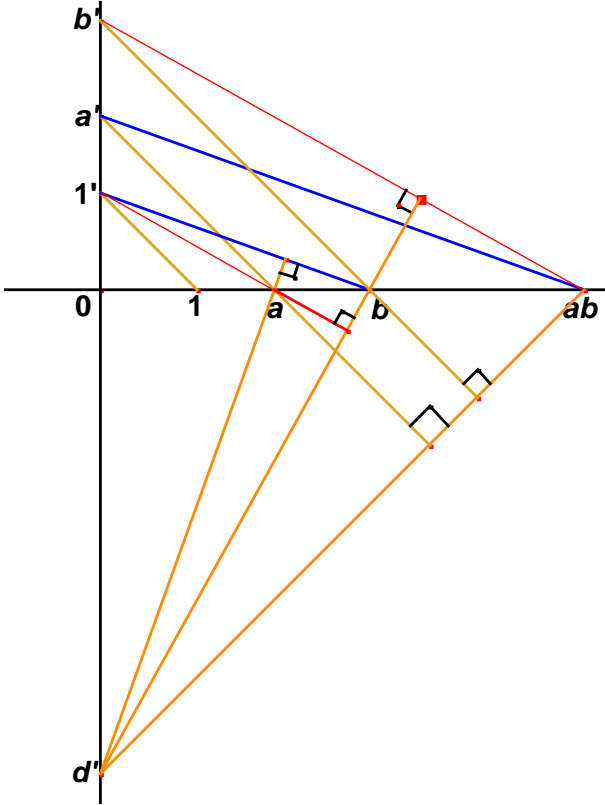


# Geometrische Multiplikation im Schulbuch

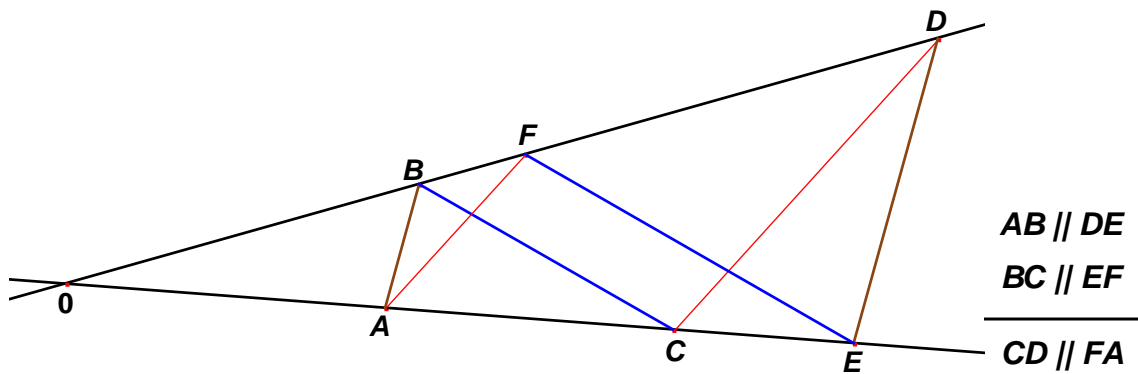


In: Erich Habler, Simon Kappl, Hans Lippert, Christoph Sobotta: *Mathematik für Realschule – 7. Jahrgangsstufe*, Frankfurt am Main – München: 1994 (Verlag Moritz Diesterweg, Bayerischer Schulbuchverlag).

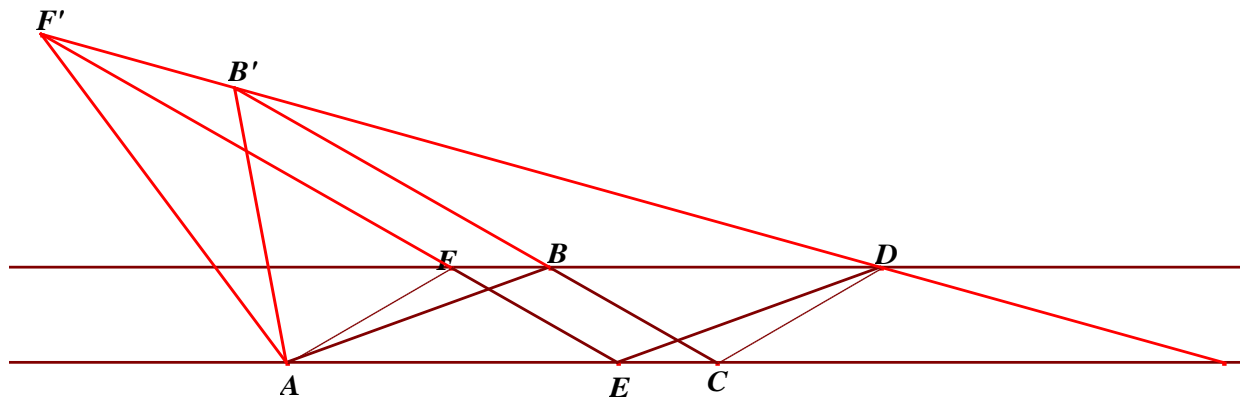
## Kommutativität der Multiplikation



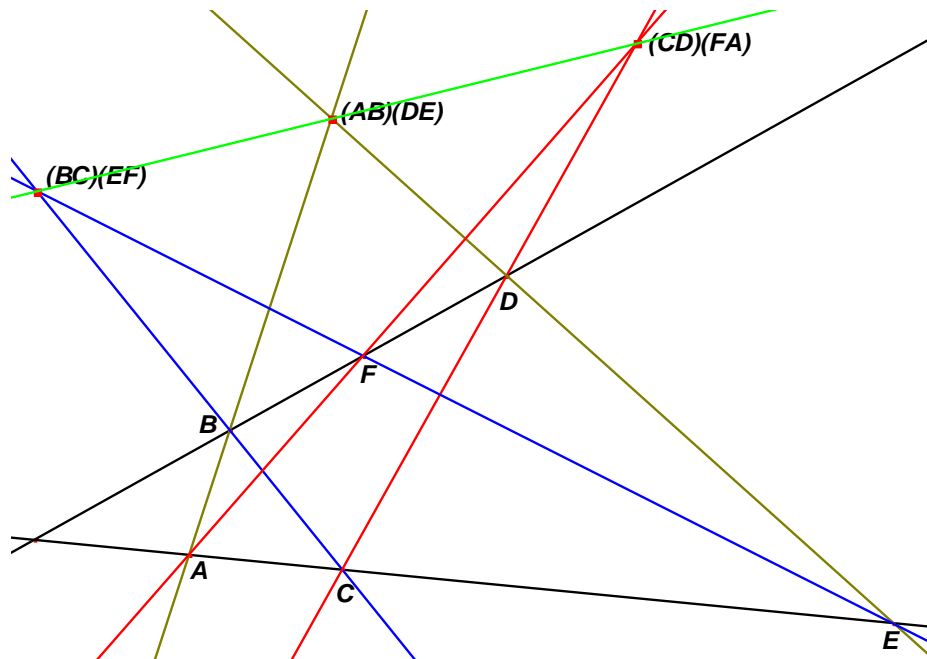
großer affiner Satz von Pappos



großer affiner Satz von Pappos  $\Rightarrow$  kleiner affiner Satz von Pappos

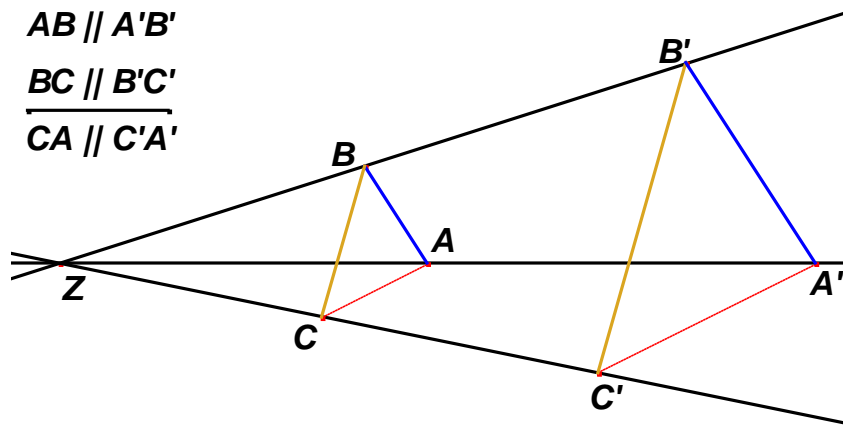


großer projektiver Satz von Pappos



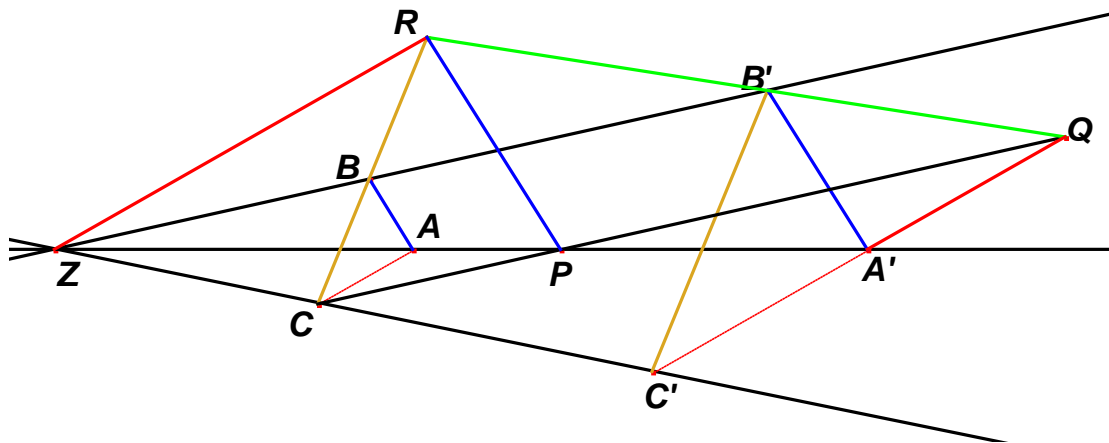
großer affiner Satz von [Desargues](#)

$$\begin{array}{l} AB \parallel A'B' \\ BC \parallel B'C' \\ \hline CA \parallel C'A' \end{array}$$



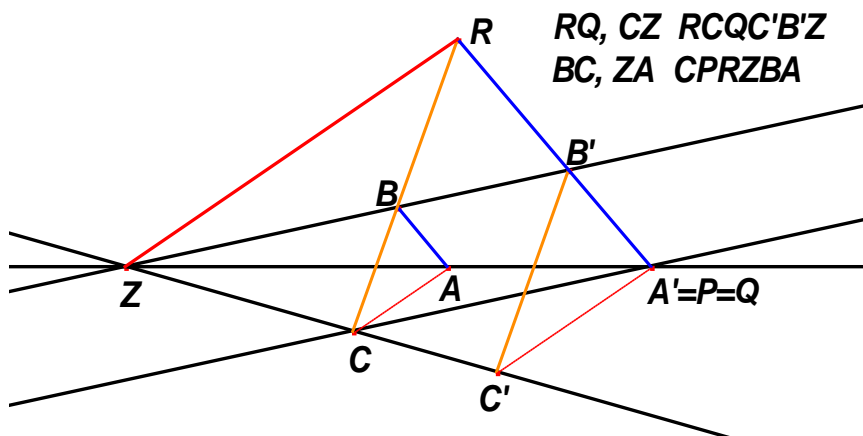
Pappos  $\Rightarrow$  Desargues (allgemeiner Fall)

$$\begin{array}{l} RQ, ZC \quad RCQC'B'Z \\ RQ, ZA \quad RZB'A'QP \\ BC, ZA \quad CPRZBA \end{array}$$

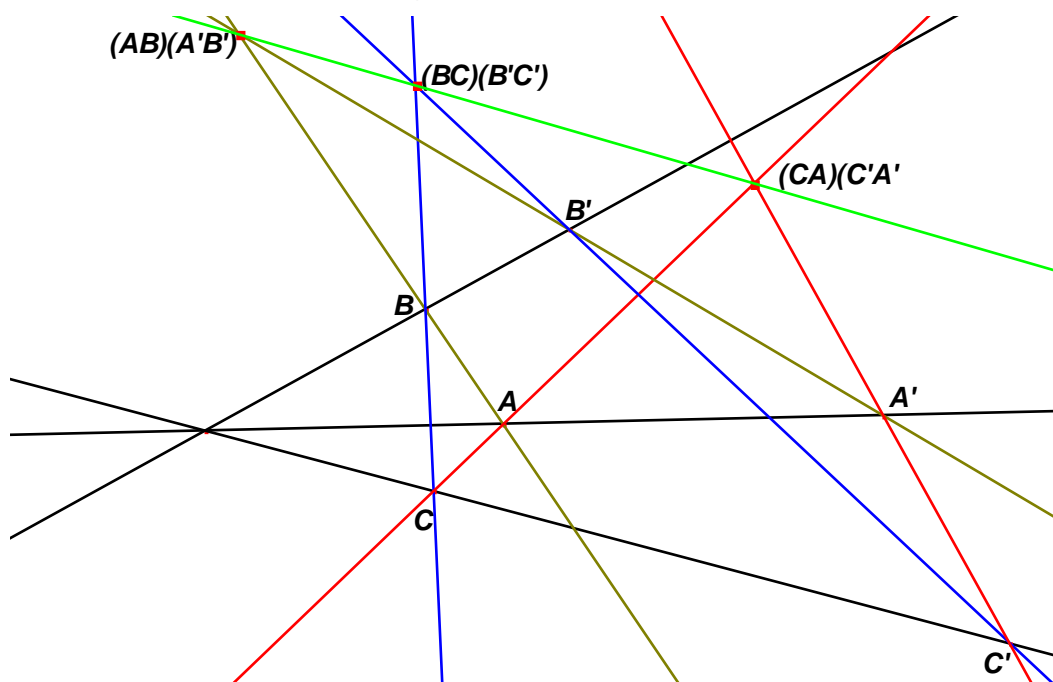


Sonderfall

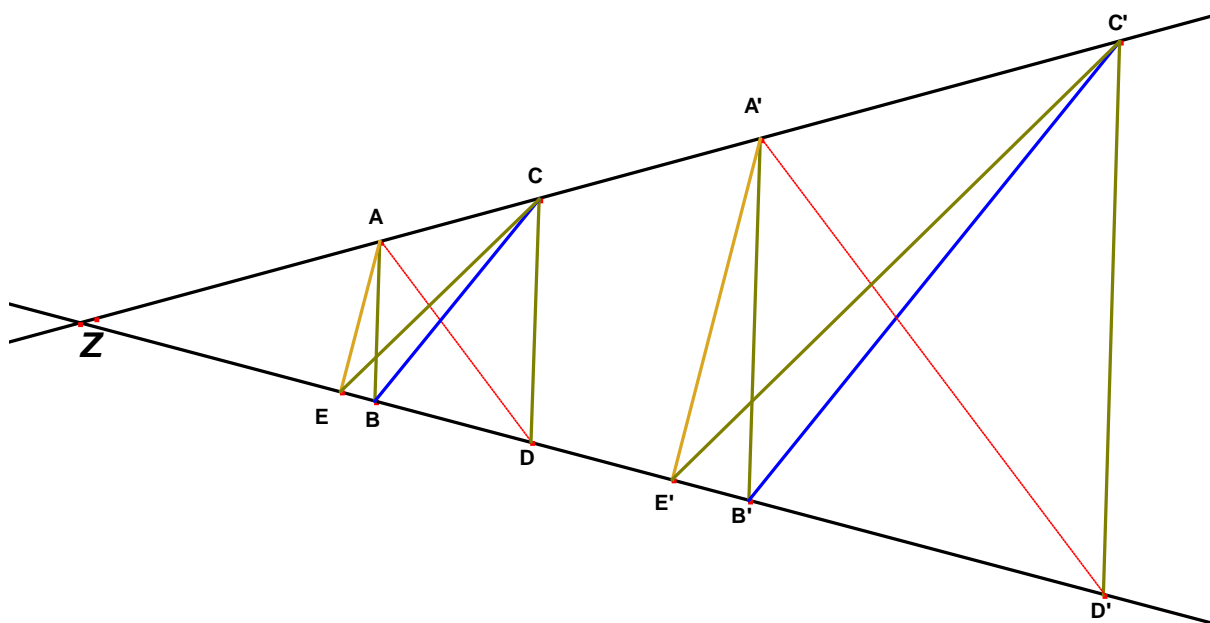
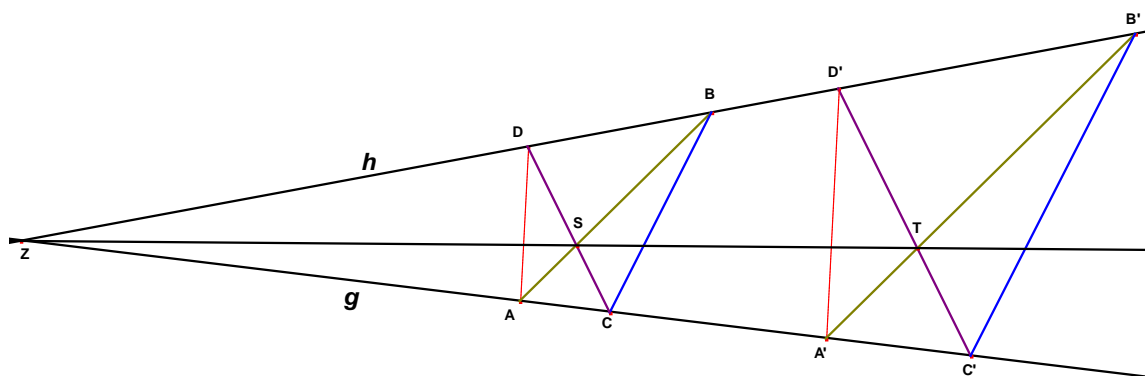
$$\begin{array}{l} RQ, CZ \quad RCQC'B'Z \\ BC, ZA \quad CPRZBA \end{array}$$



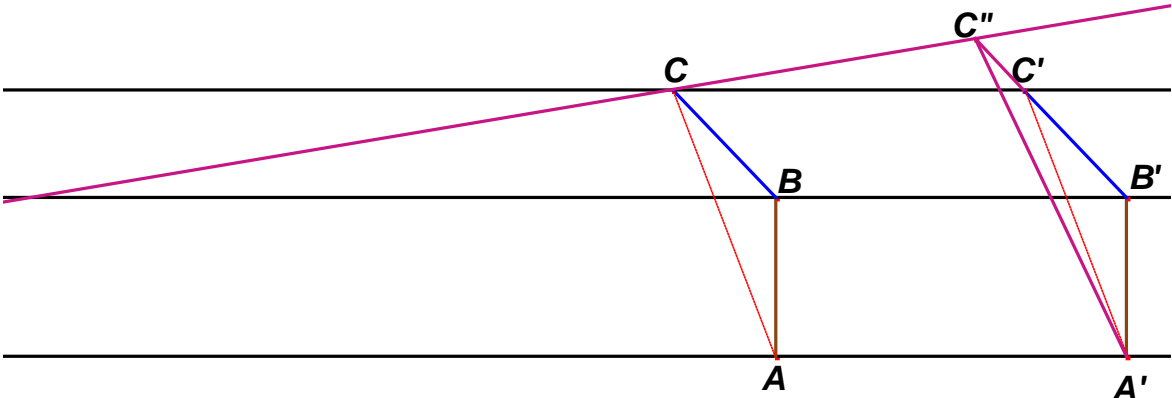
großer projektiver Satz von Desargues



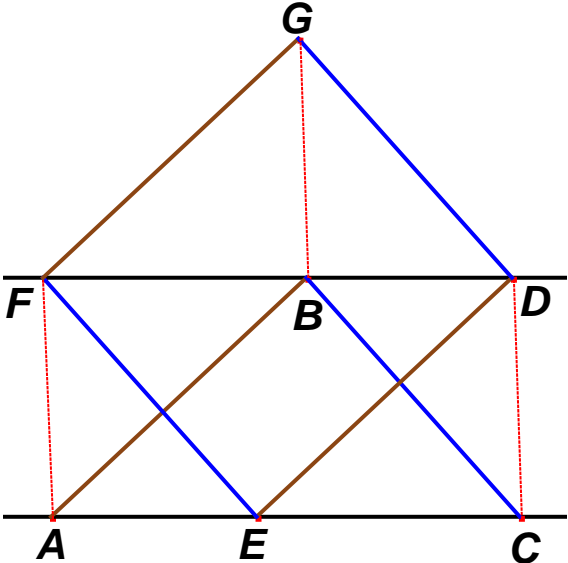
großer Scherensatz



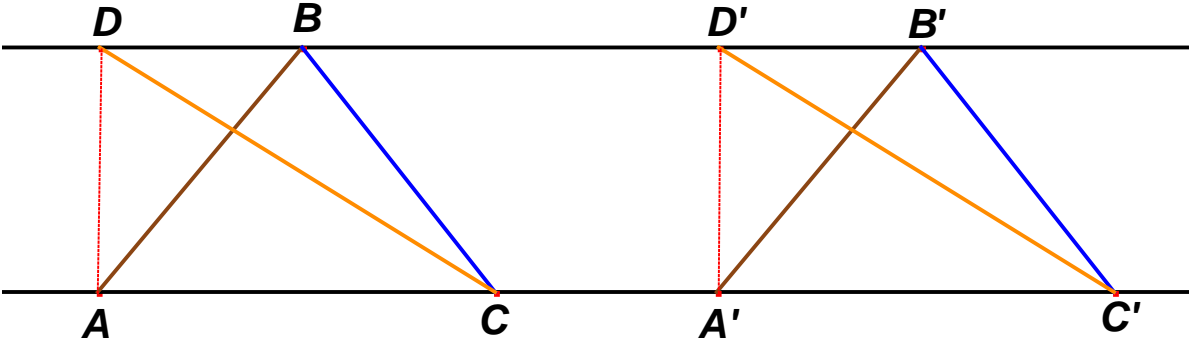
kleiner affiner Satz von Desargues



kleiner affiner Satz von Pappos

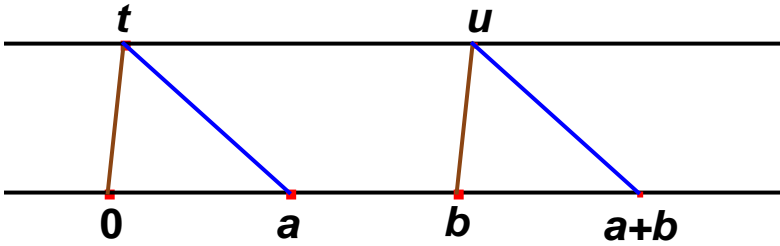


kleiner Scherensatz

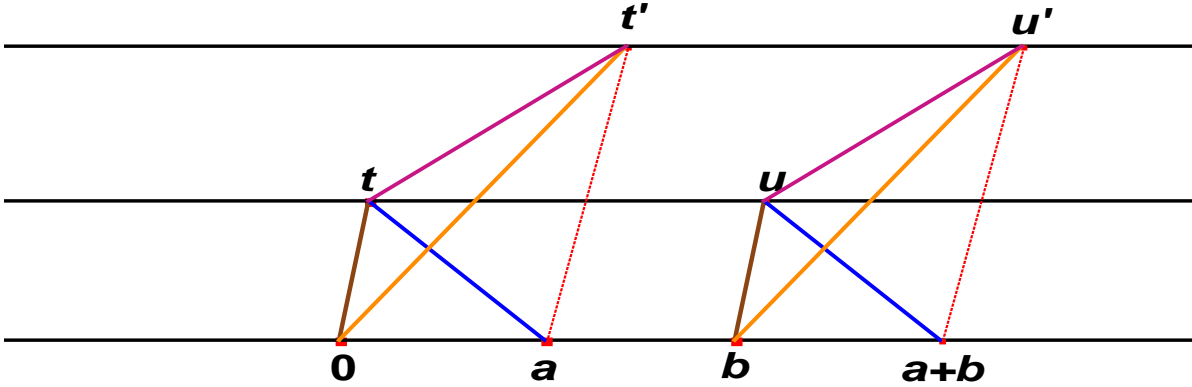
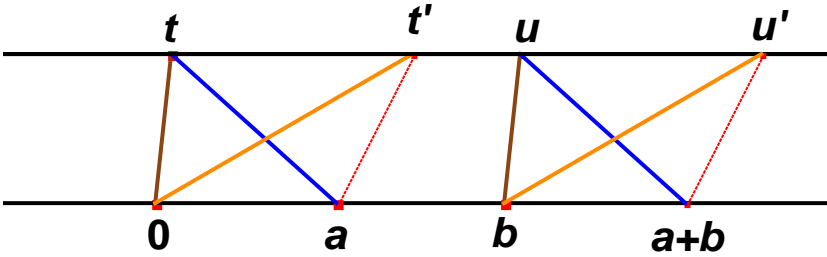
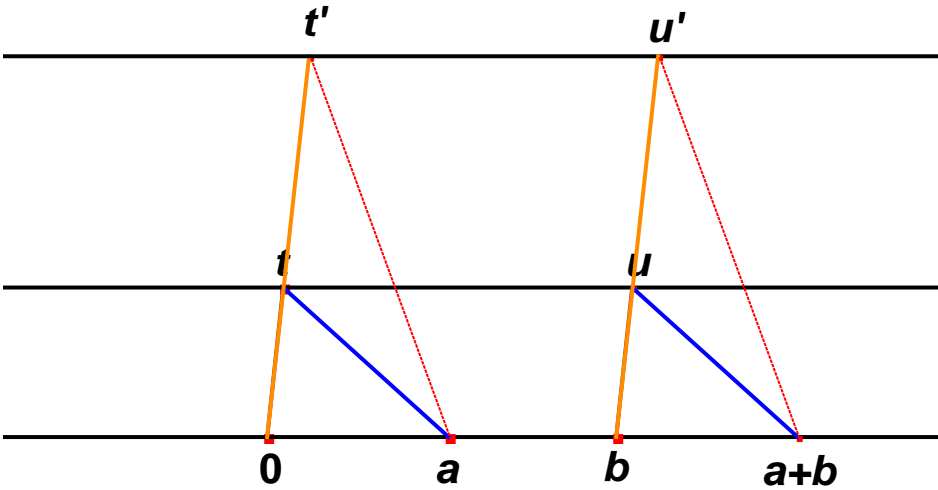




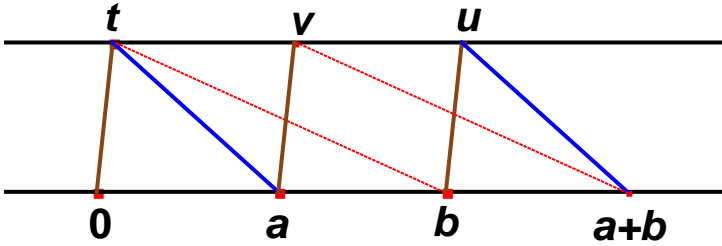
Addition



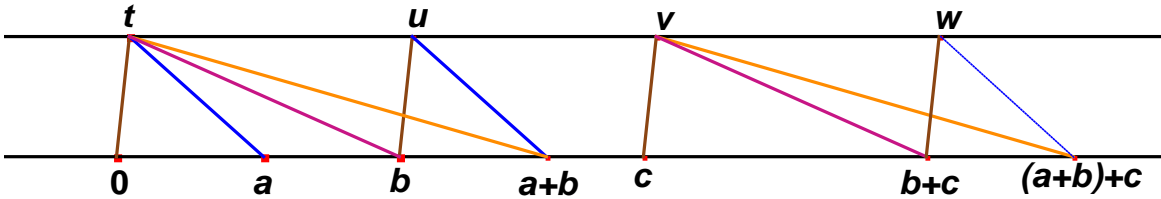
Unabhängigkeit von  $t$ .



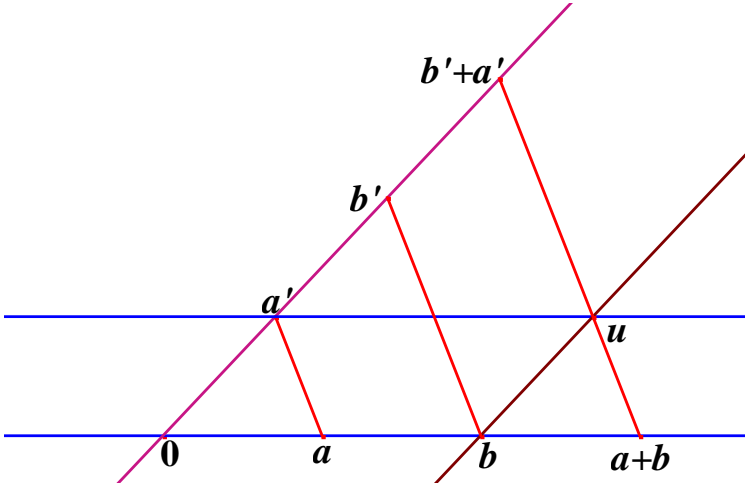
Kommutativität



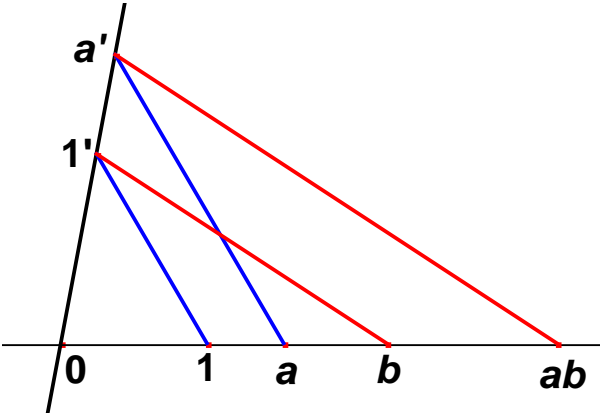
Assoziativität



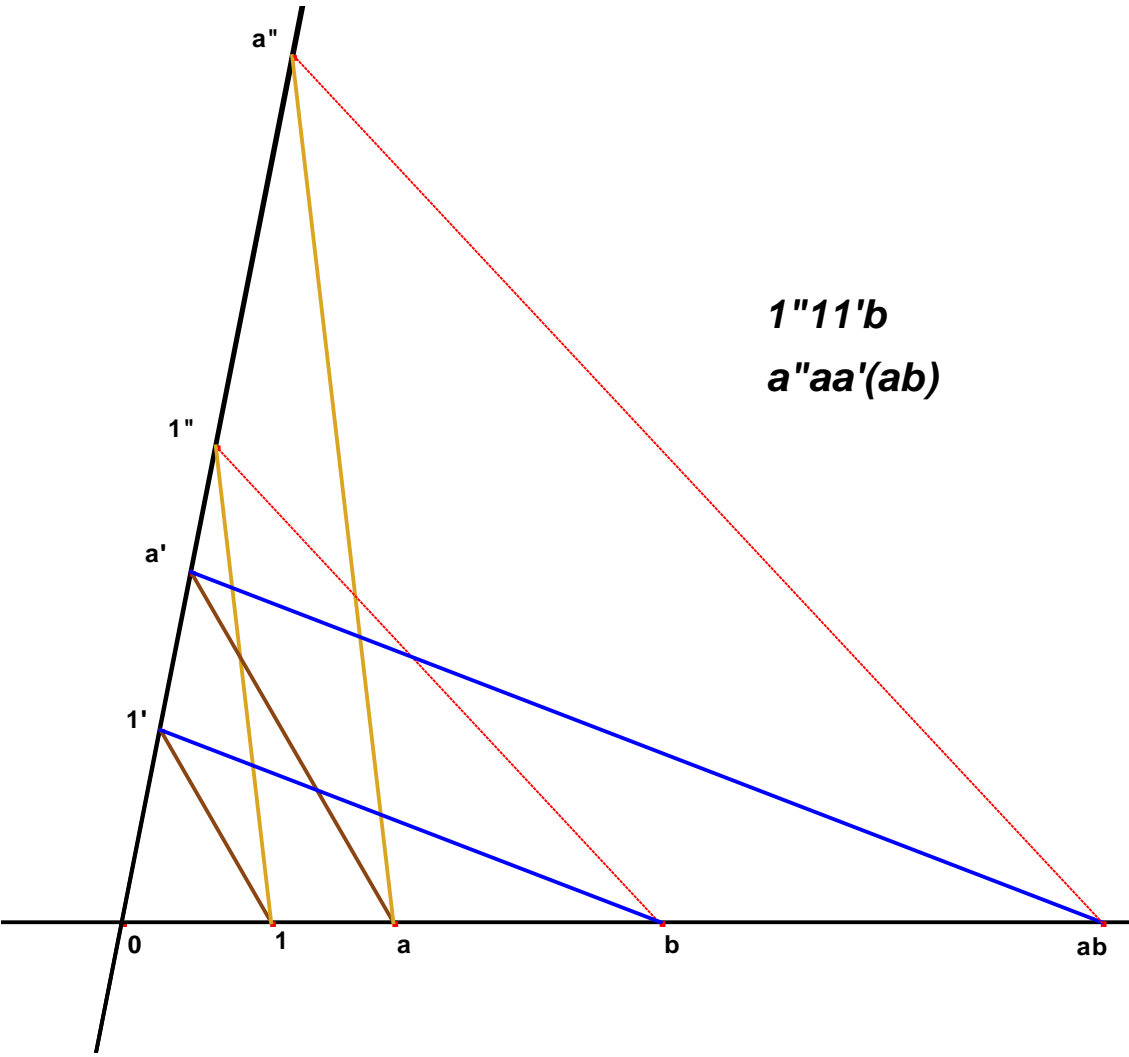
Parallelprojektion ist Isomorphismus



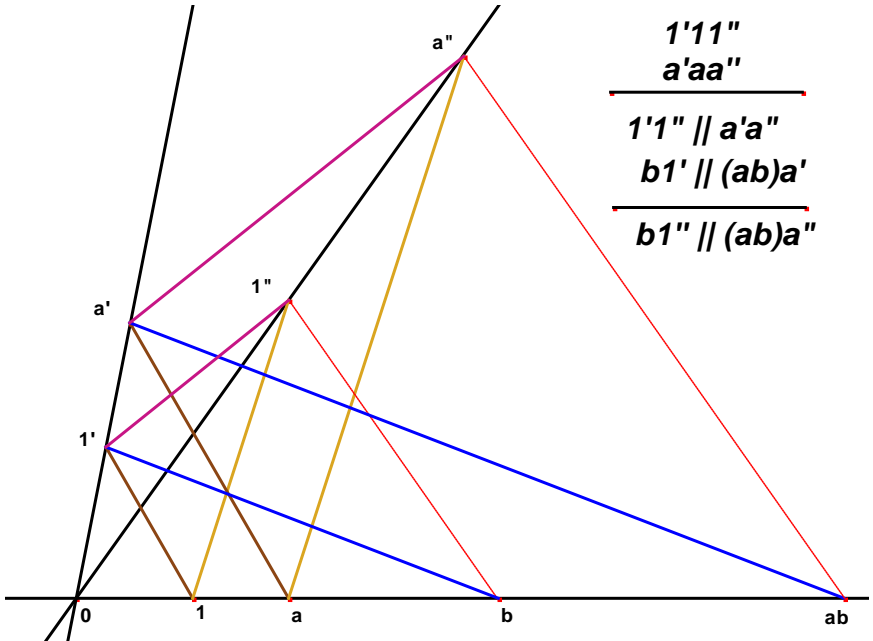
Multiplikation



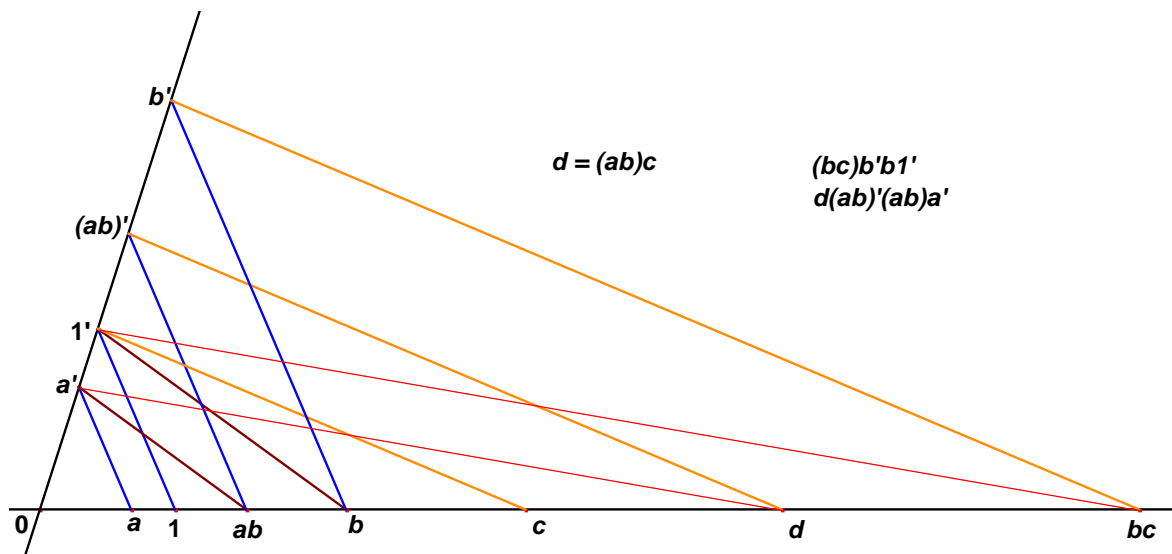
unabhängig von 1': 1. Fall



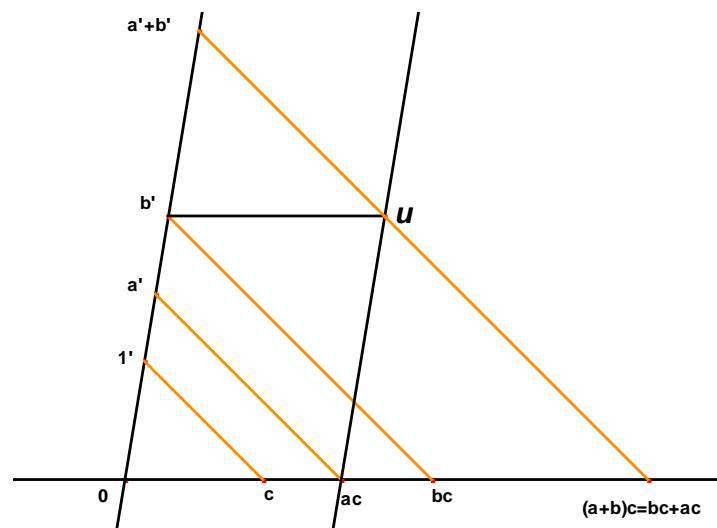
2. Fall:



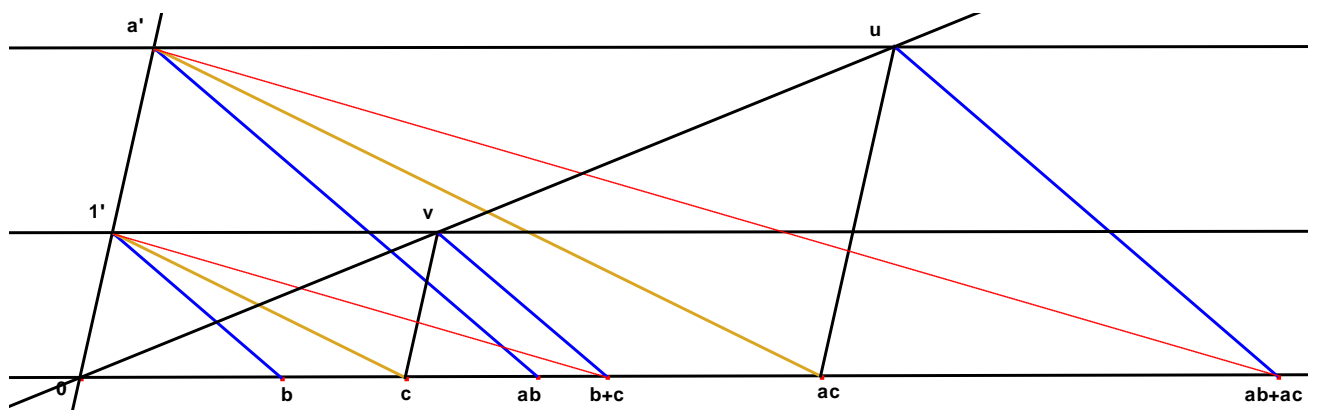
Assoziativität:



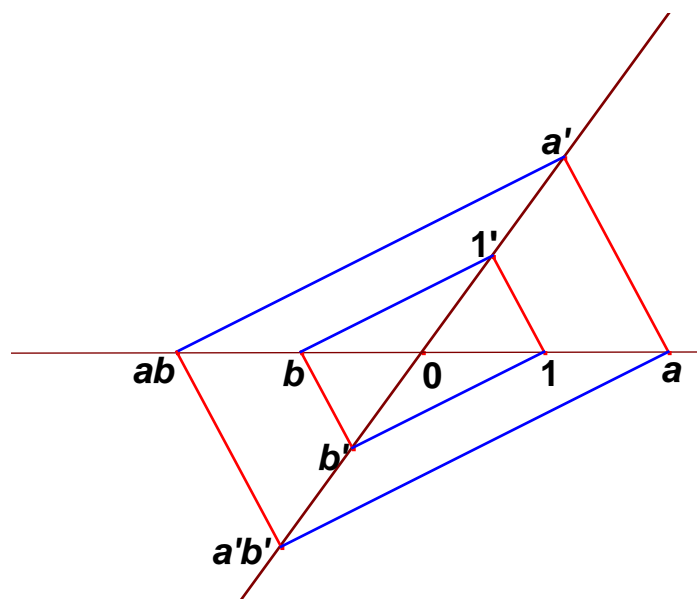
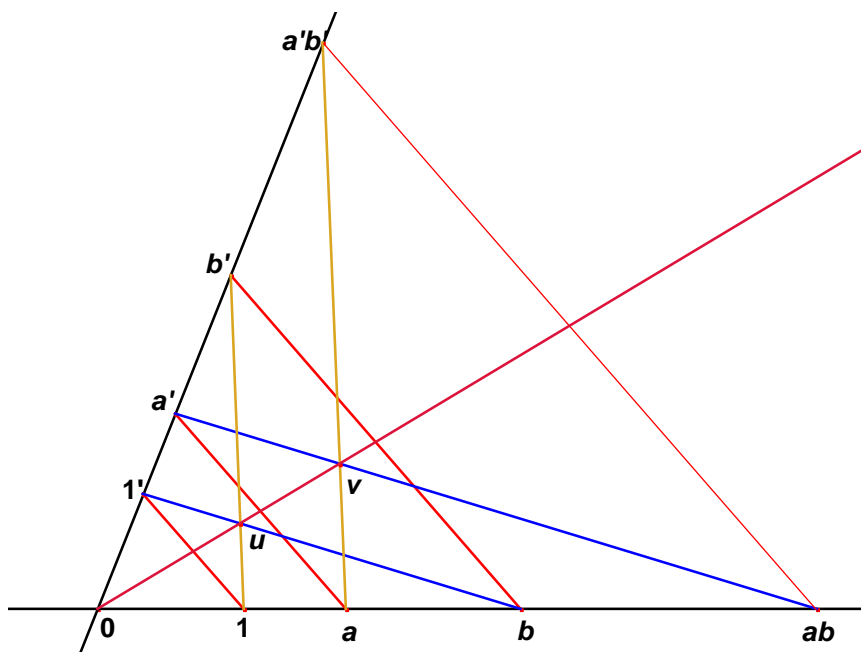
Rechtsdistributivität:



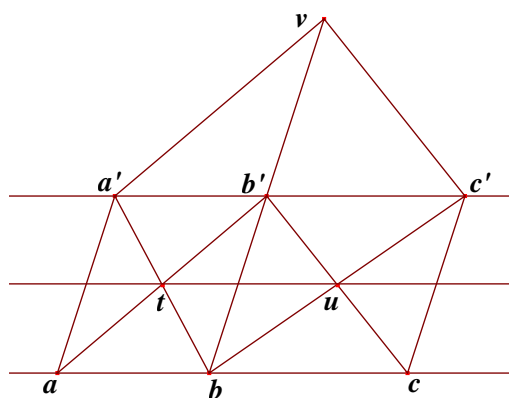
Linksdistributivität



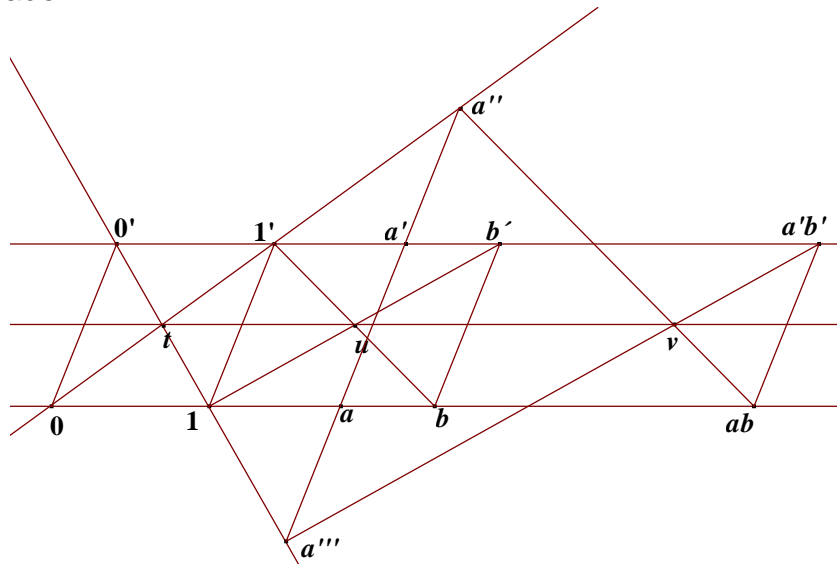
Verträglichkeit der Multiplikation mit der Parallelprojektion von einer Geraden auf eine andere Gerade durch 0.



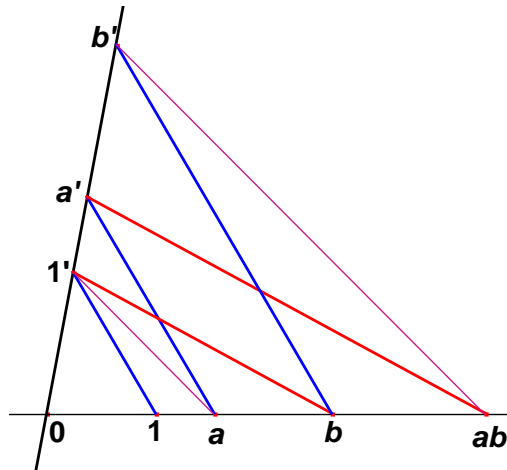
Satz von der Mittelparallelen



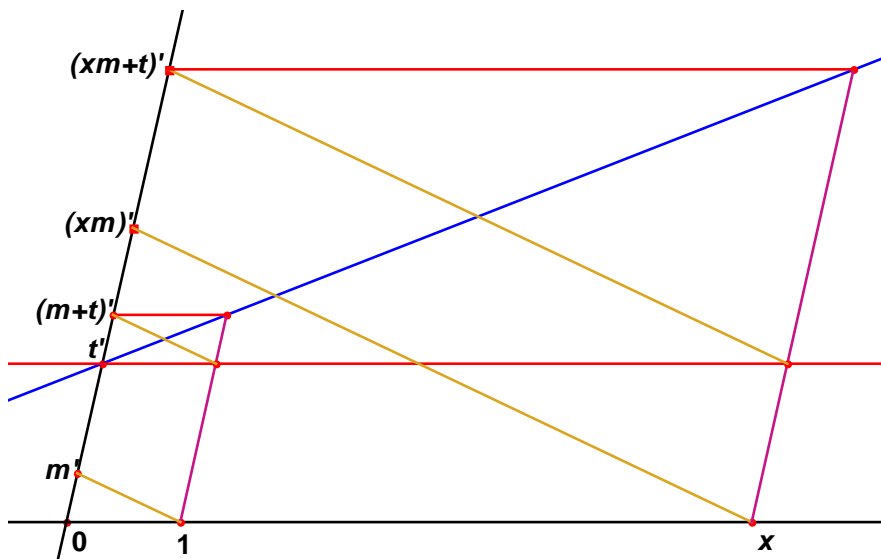
Verträglichkeit der Multiplikation mit der Parallelprojektion von einer Geraden auf eine parallele Gerade.



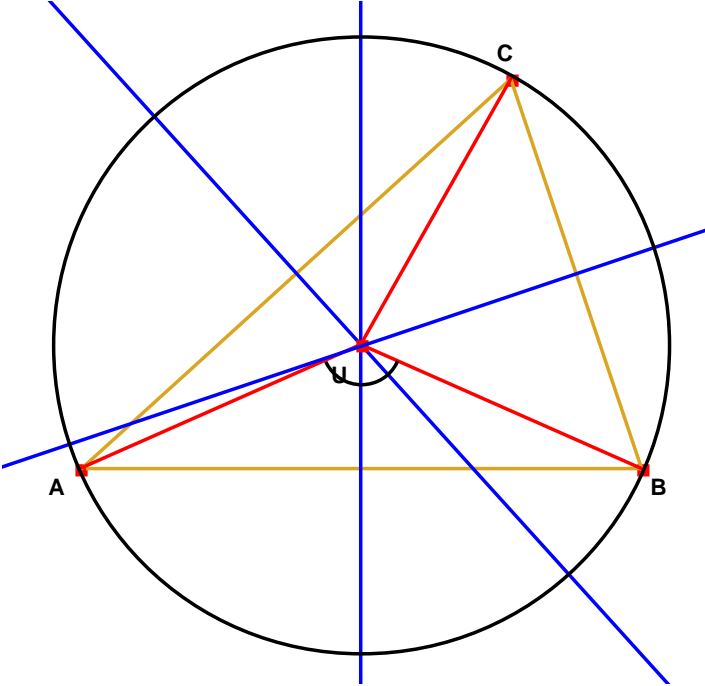
Kommutativität:



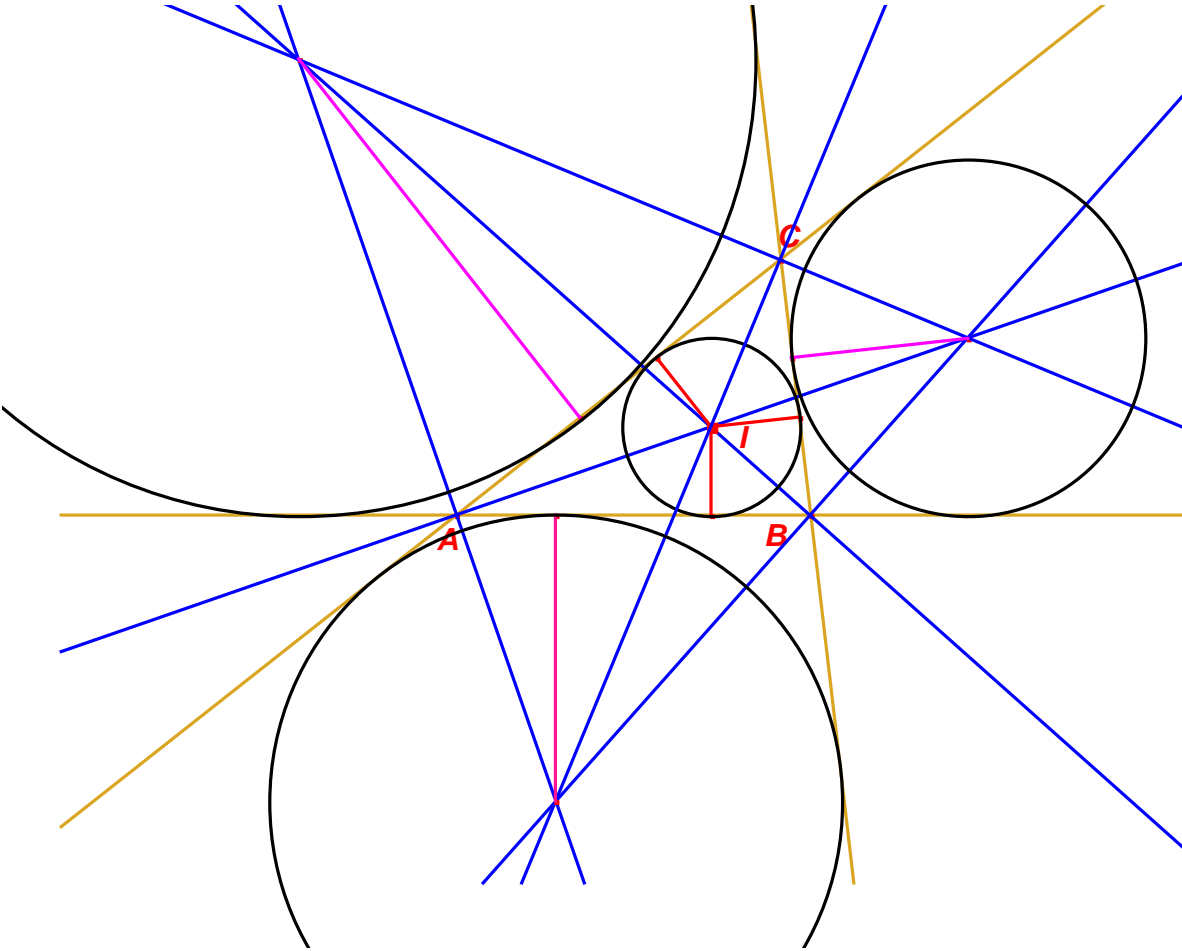
Geraden der Form  $y = x \cdot m + t$ .



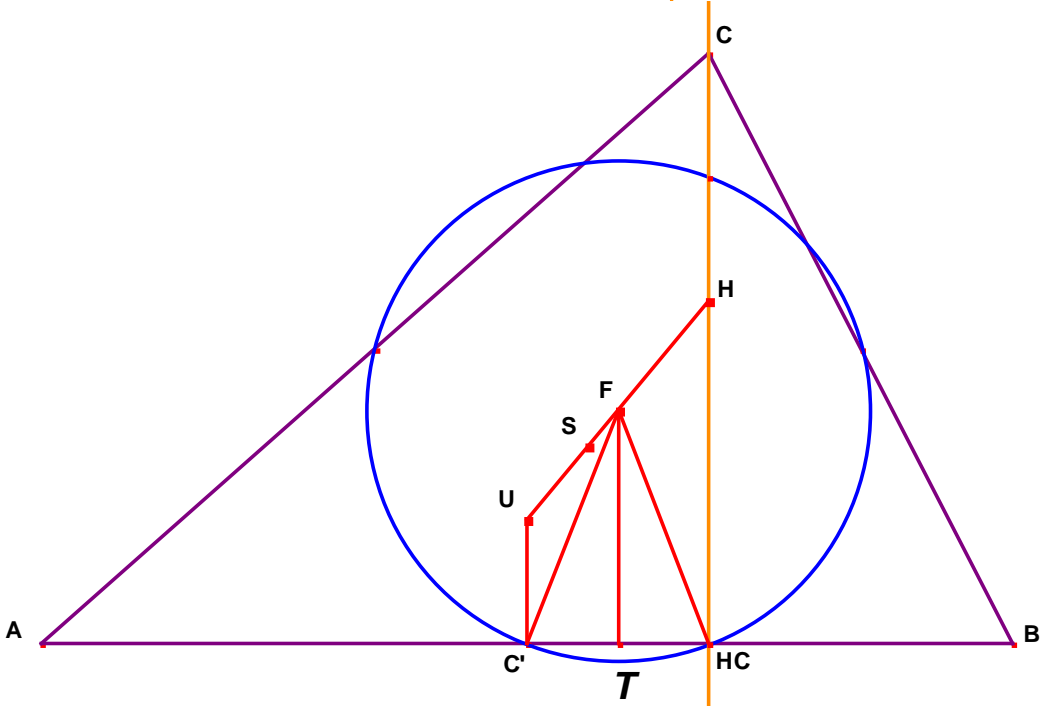
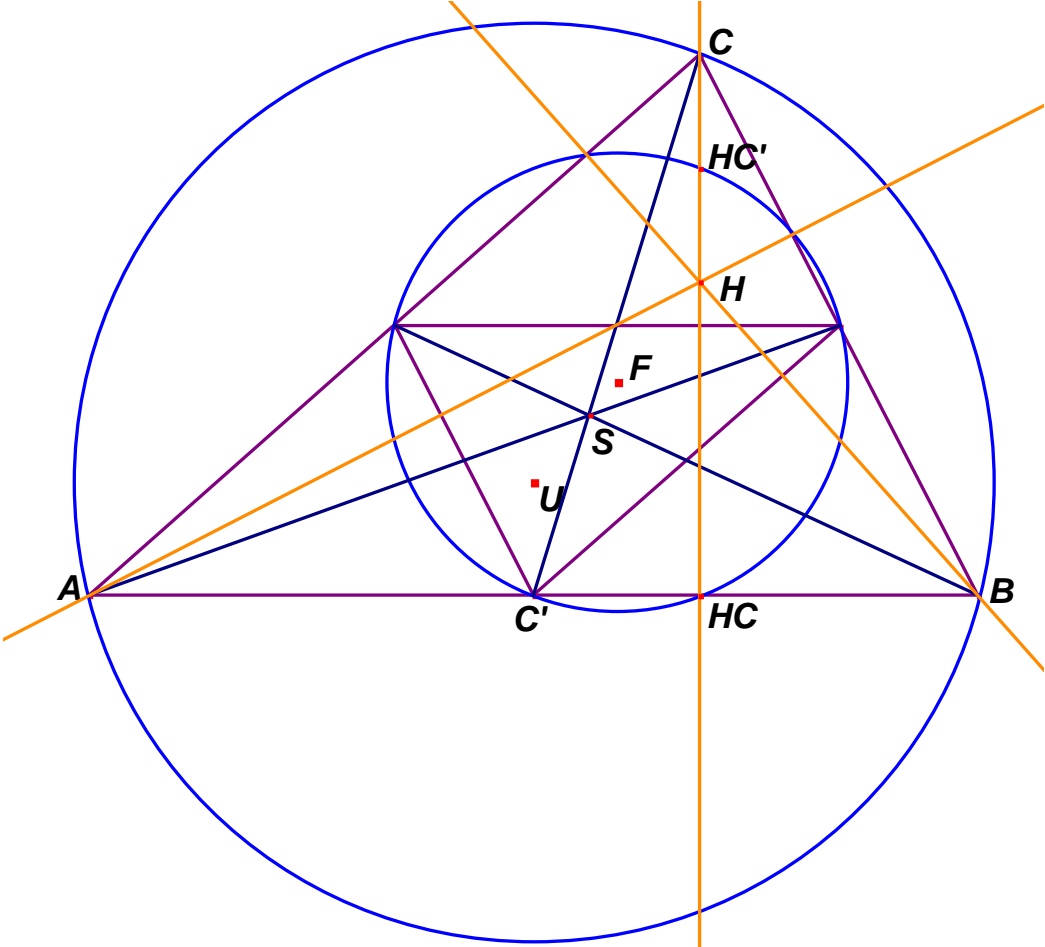
Umkreis



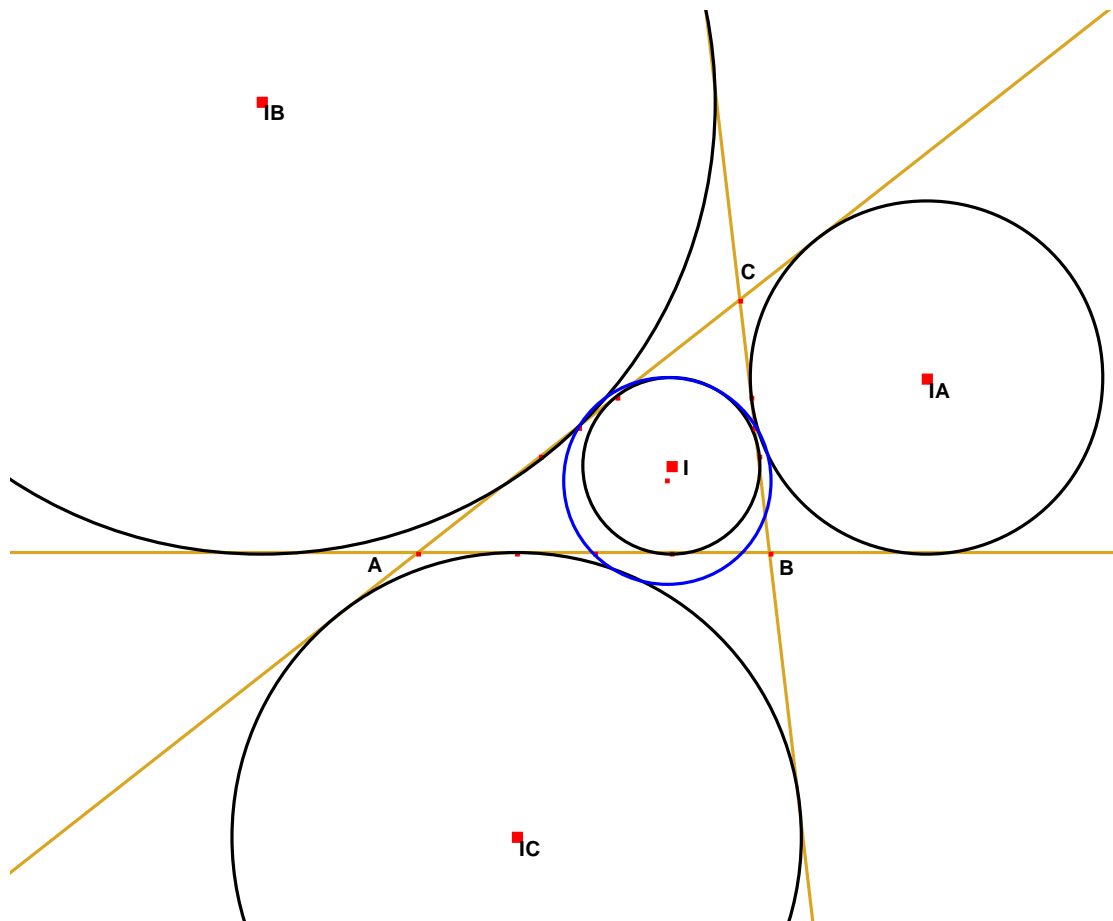
Inkreis und Ankreise



Feuerbach-Kreis

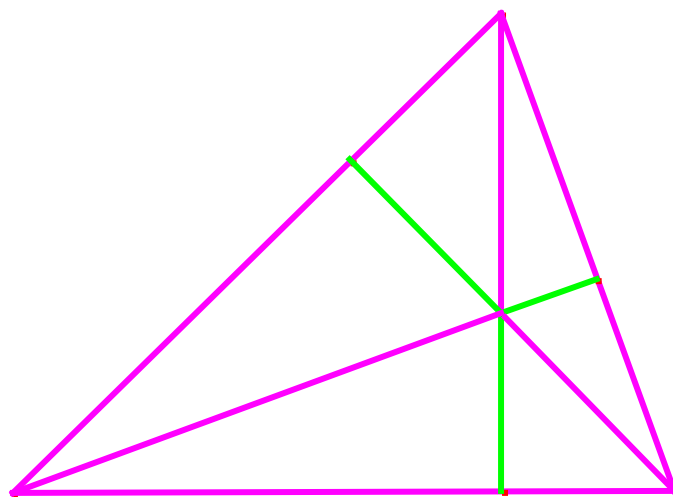






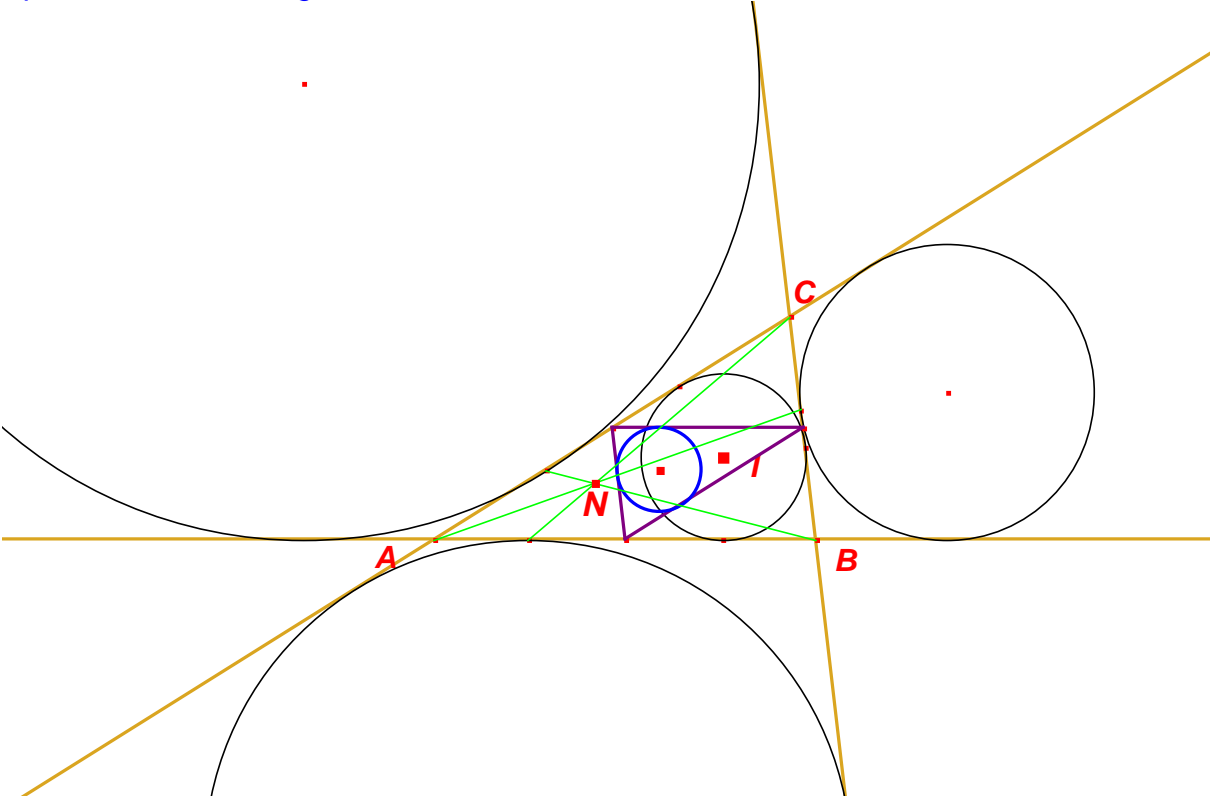
[Maple-Berechnung](#)

Orthozentrisches Viereck

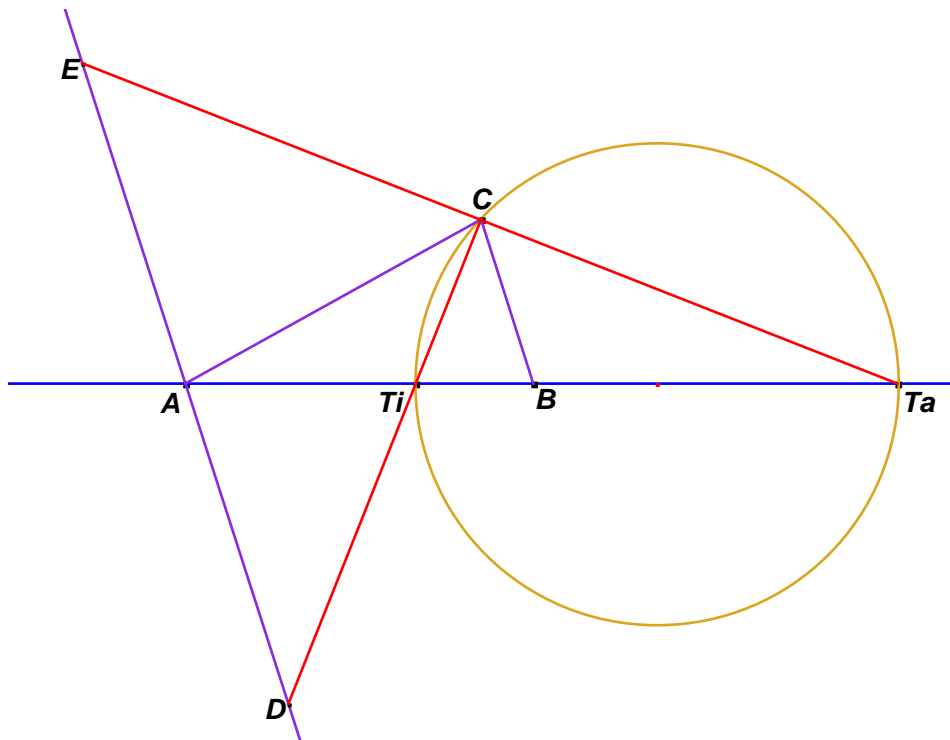


[16 Kreise berühren den Feuerbach-Kreis.](#)

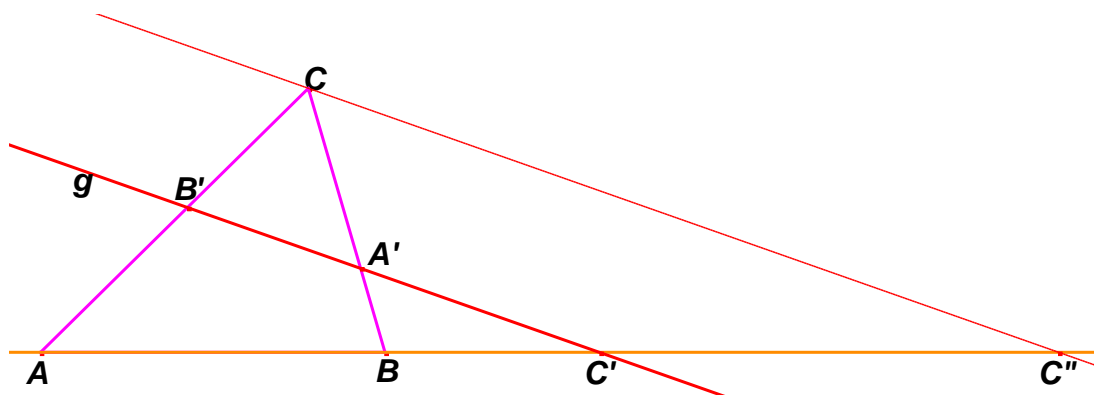
Spieker-Kreis mit Nagel-Punkt



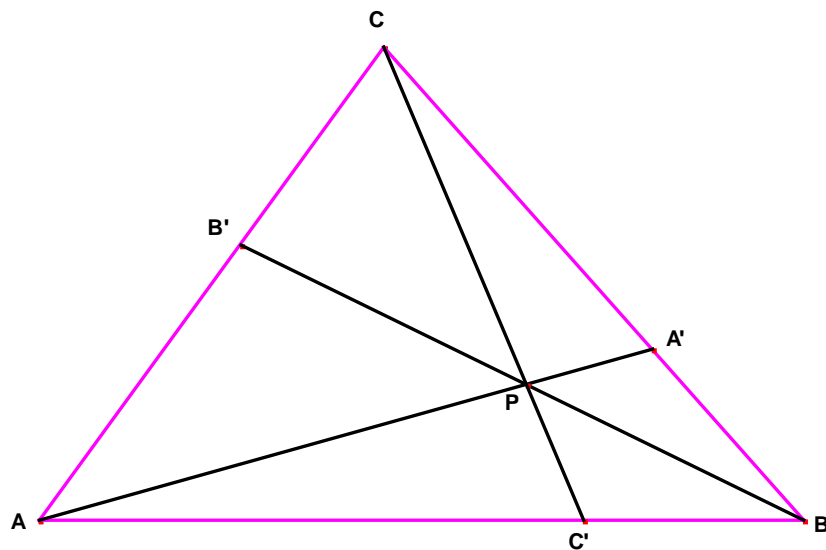
Apollonios:



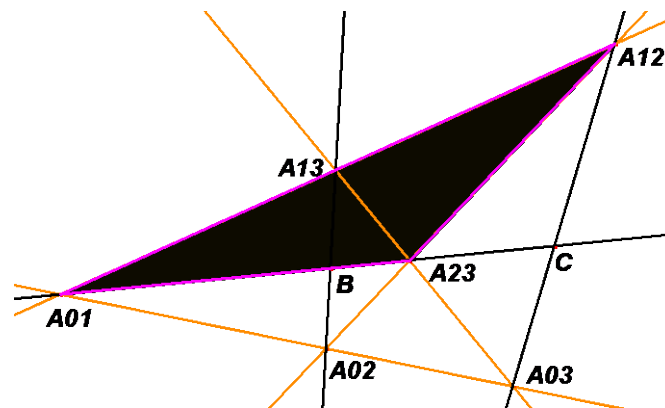
Menelaos:



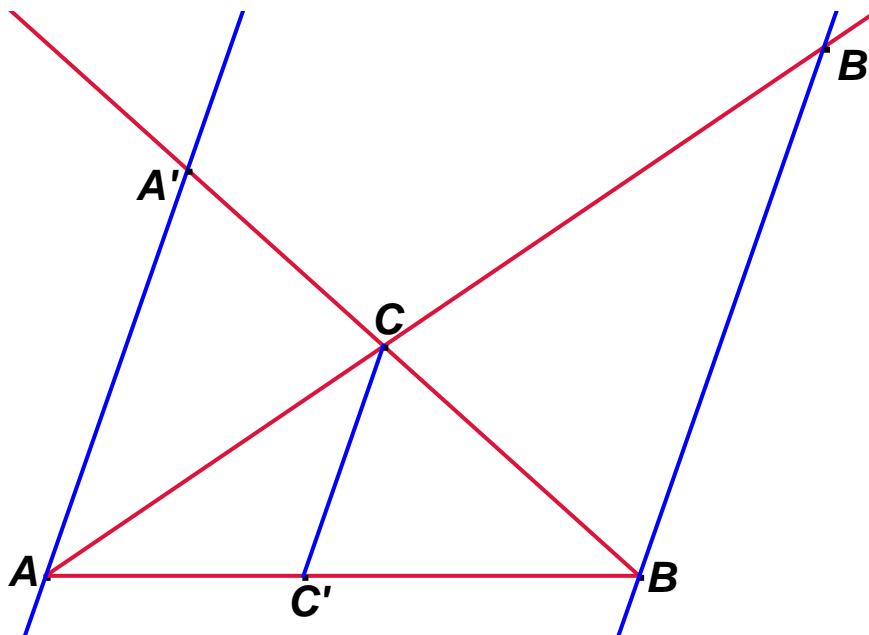
Yussuf al Mu'taman ibn Hud, Giovanni Ceva:



Satz vom vollständigen Vierseit:



Yussuf Umkehrung, zweiter Fall:



Geometrischer Ort des Gergonne-Punktes der Schar rechtwinkliger Dreiecke mit einer gegebenen festen Hypotenuse mit [GeoGebra](#) und [Cinderella](#).

Unterschied GeoGebra – [Winkelhalbierende kippt](#) – und Cinderella – [Winkelhalbierende bewegt sich stetig](#).

[Maple-Berechnung](#)

# Sternpolyeder

