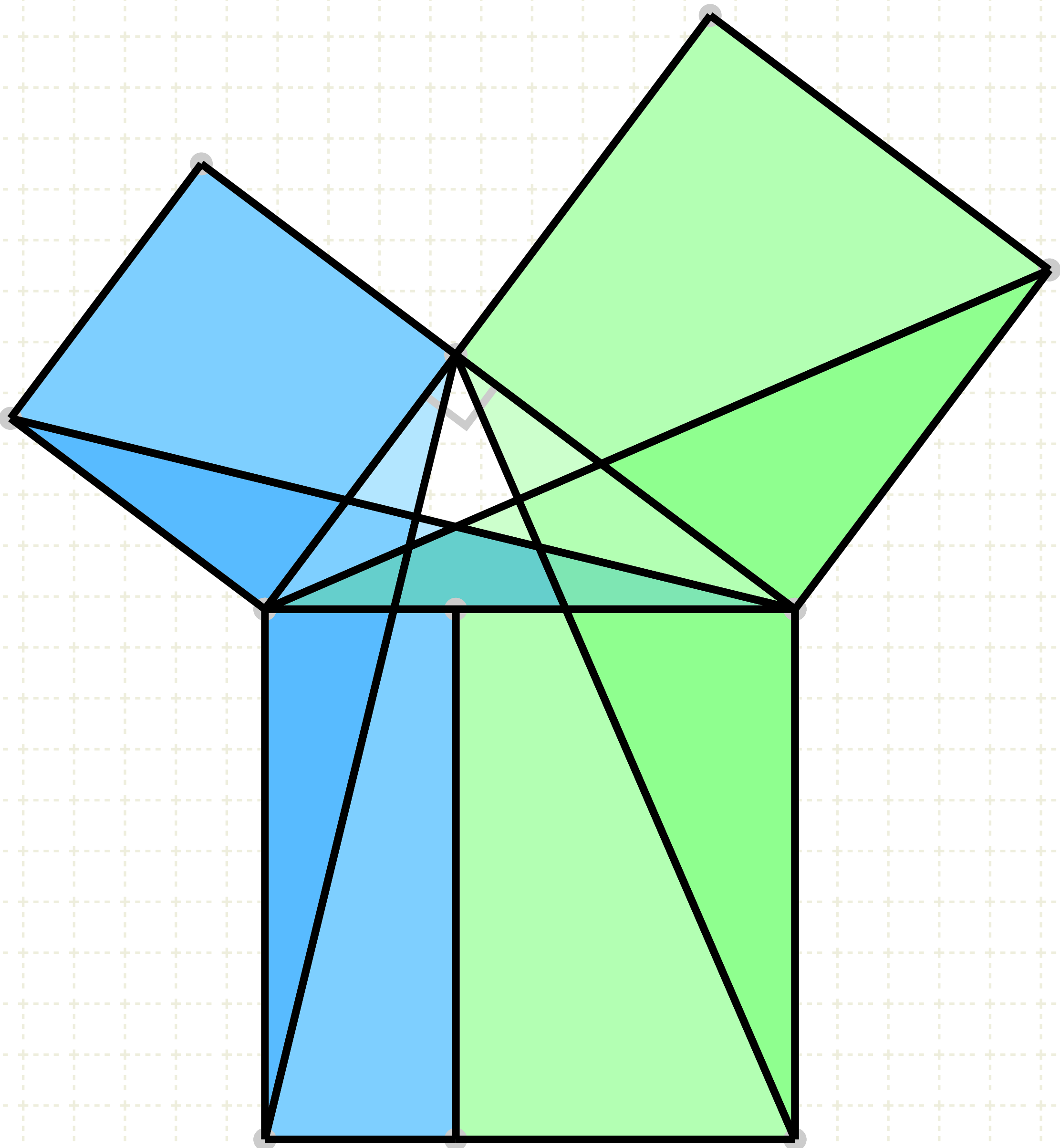
# Euclid's Elements

# Book I



*If Euclid did not kindle your youthful enthusiasm, you were not born to be a scientific thinker.*

Albert Einstein

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# Proposition 43 of Book I

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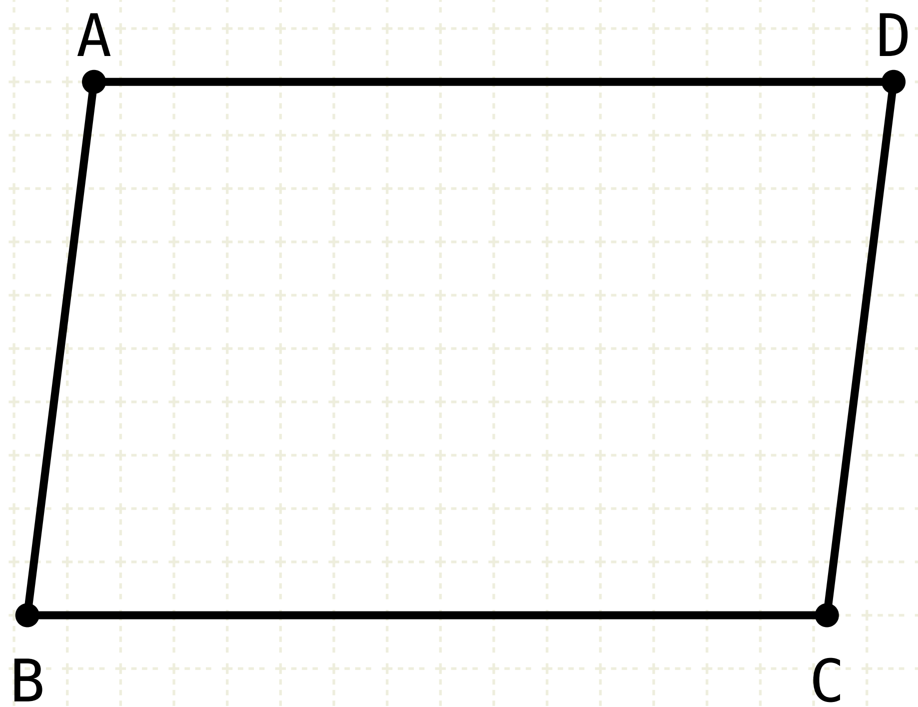


## In other words

Given a parallelogram ABCD

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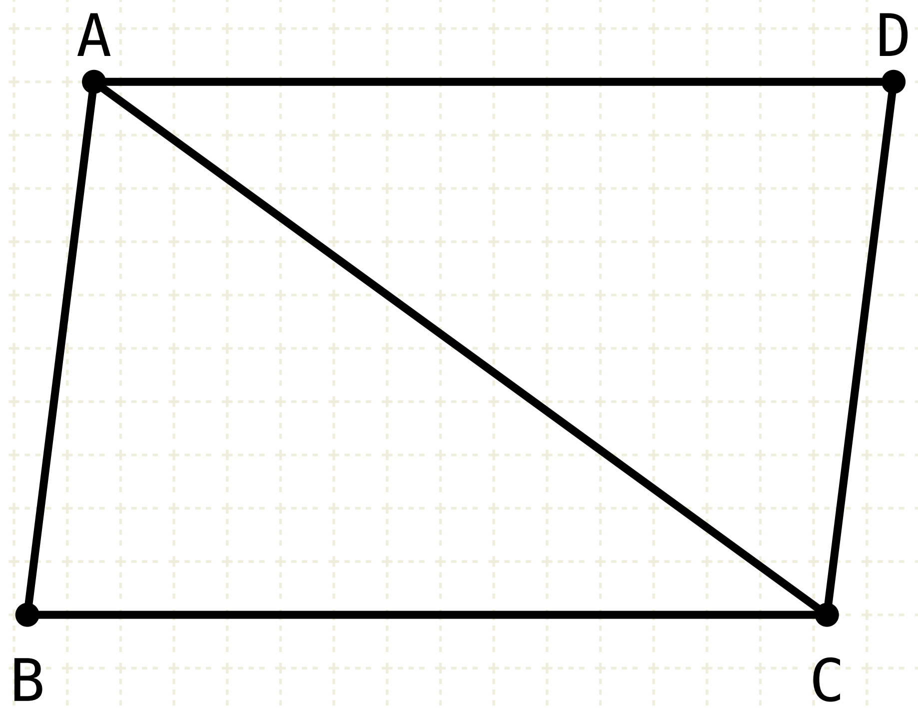
In any parallelogram the complements of the parallelograms about the diameter equal one another.

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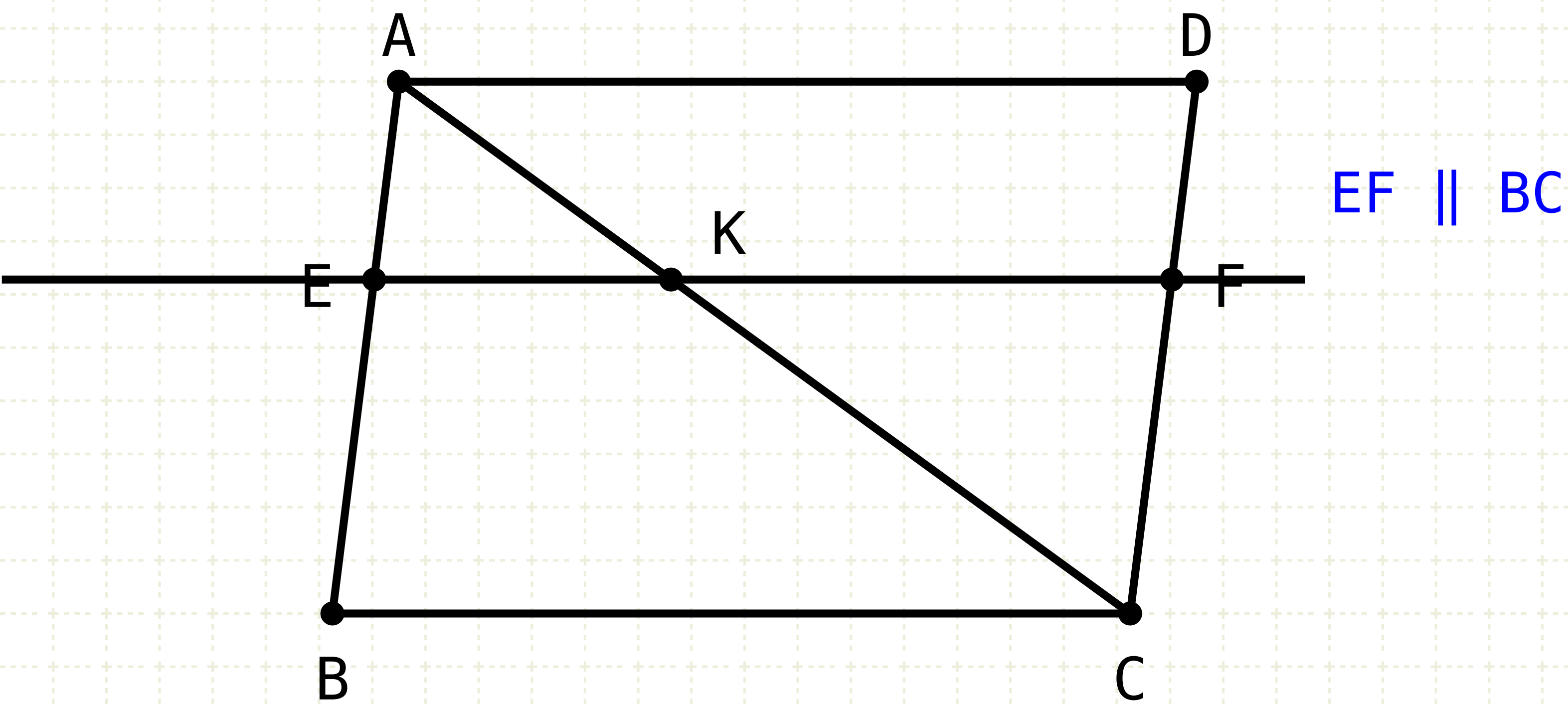


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Given a parallelogram ABCD

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And, from an arbitrary point E on line AB, draw a line parallel to AD intersecting the diagonal at point K

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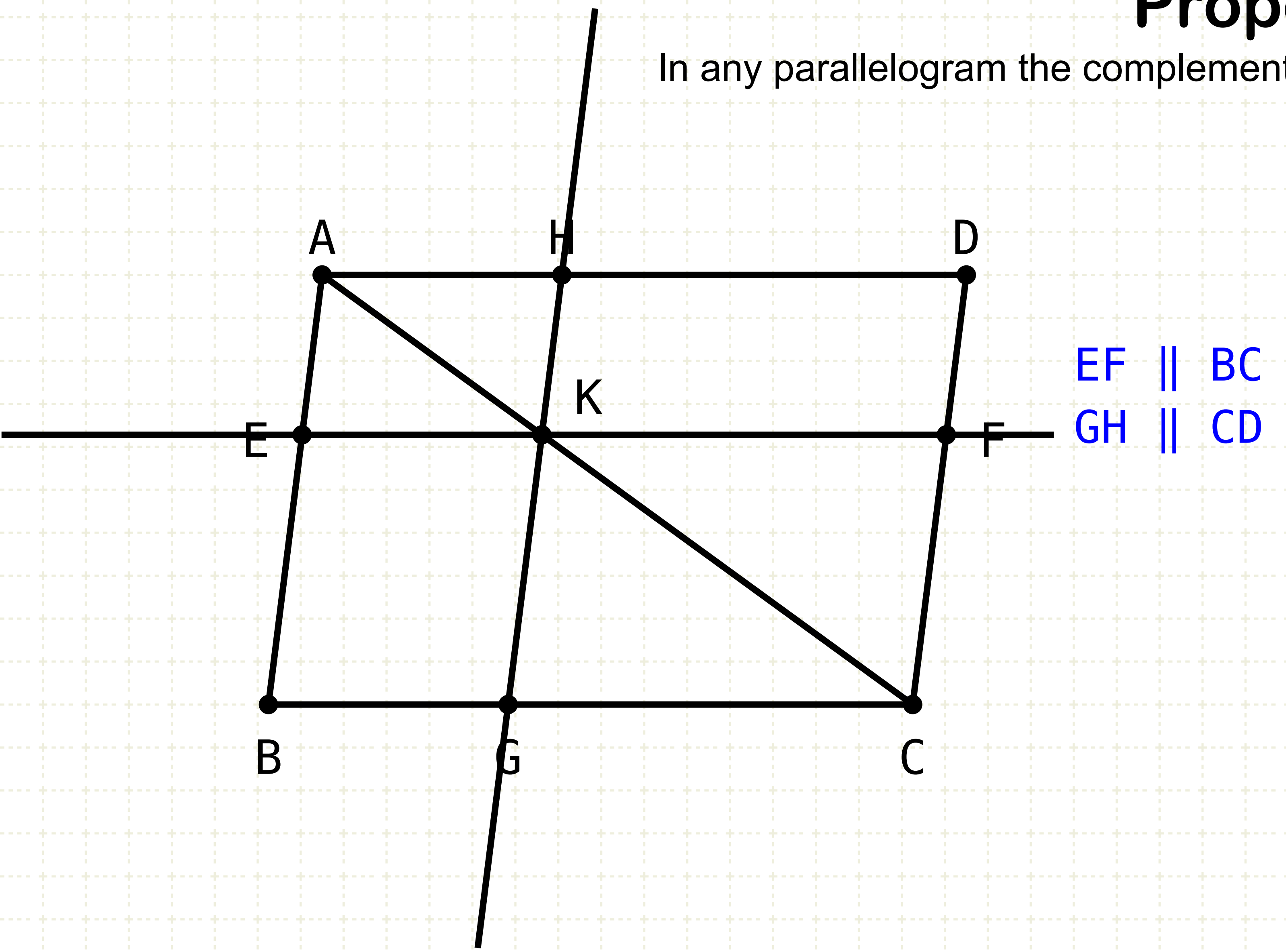


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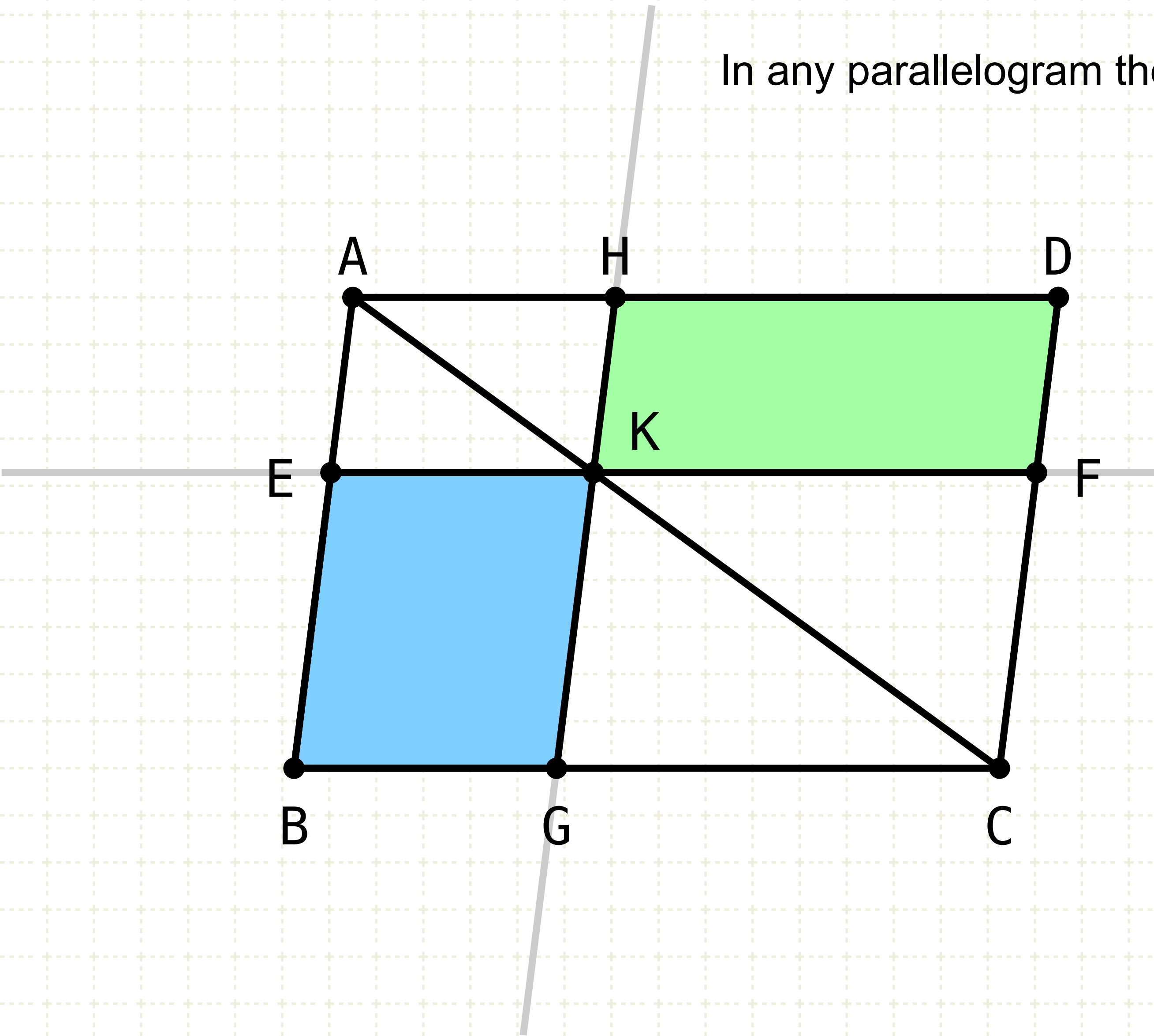


EF || BC
GH || CD
EBGK = HKFD

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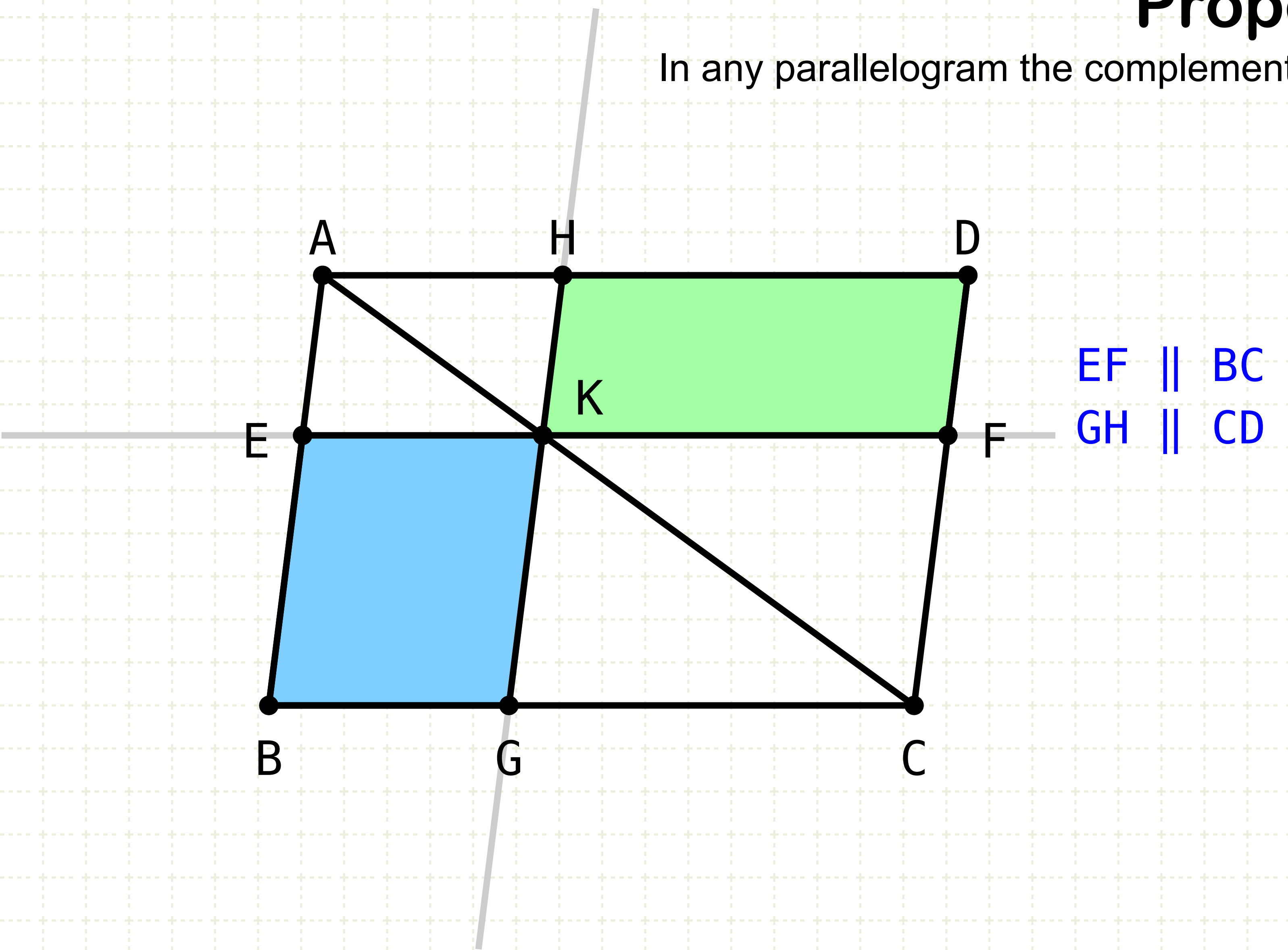


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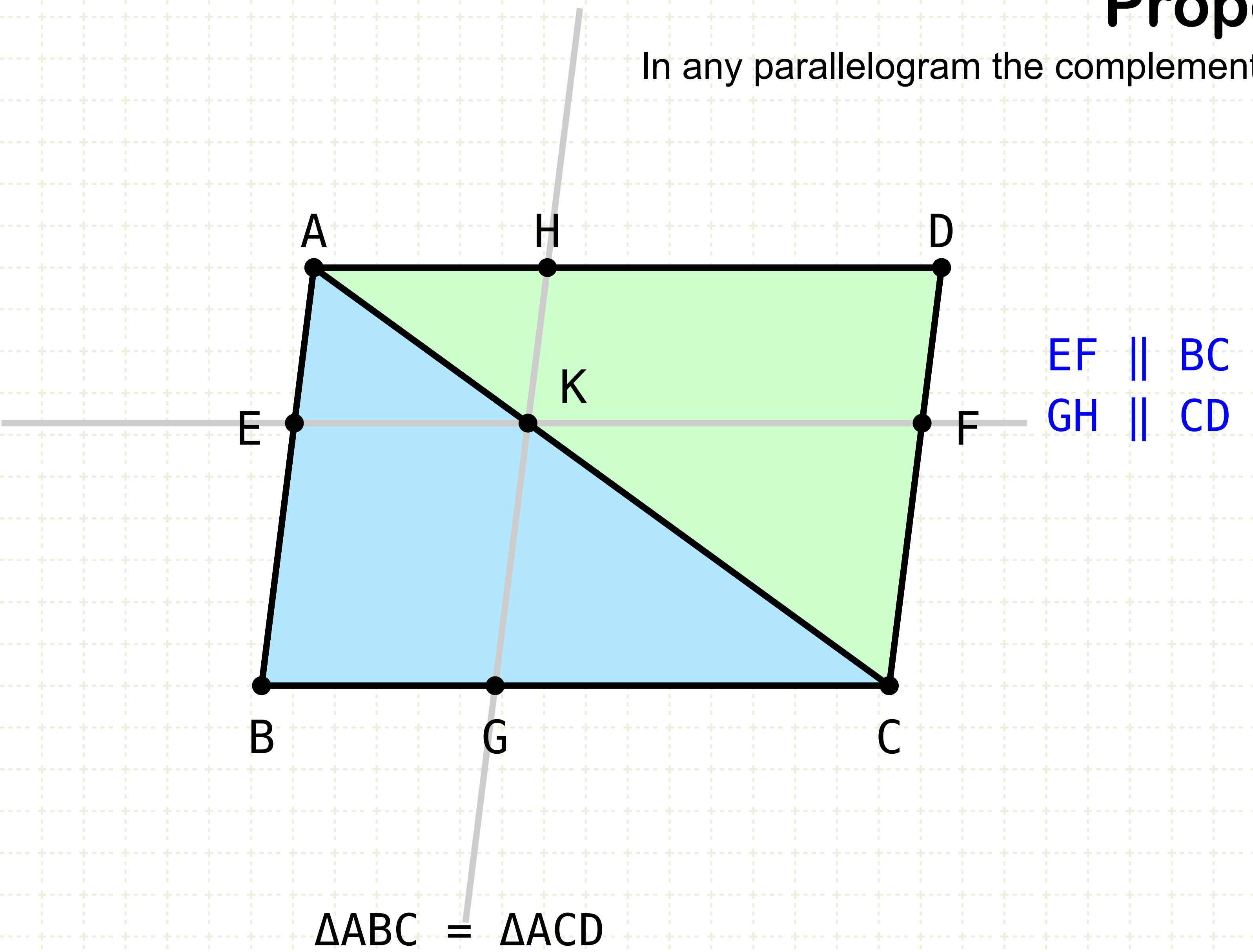


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Since AC is the diameter of the parallelogram ABCD, triangles ABC and ACD are equal (I·34)

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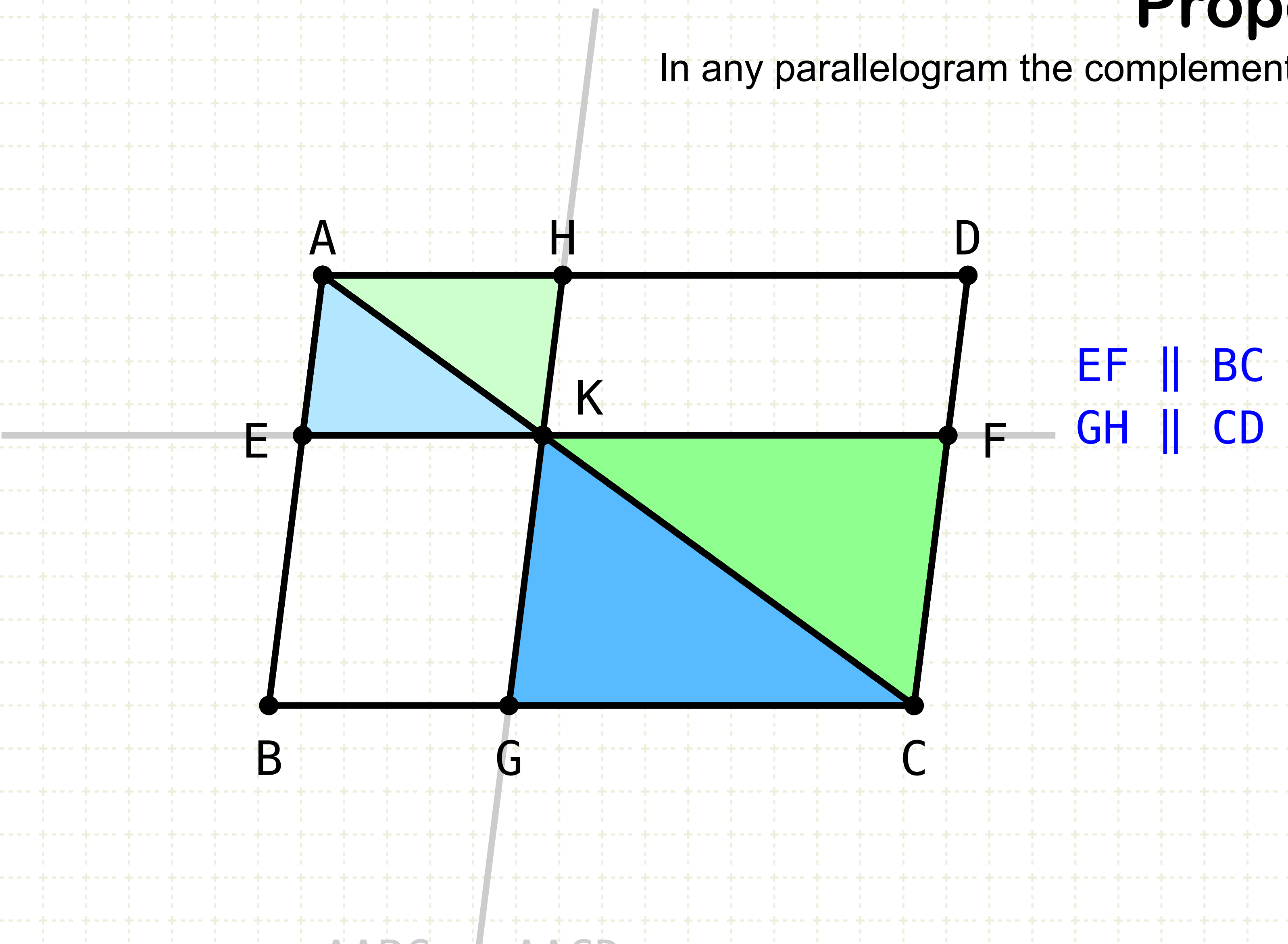


$\Delta ABC = \Delta ACD$

$\Delta AEK = \Delta AKH, \quad \Delta KGC = \Delta KCF$

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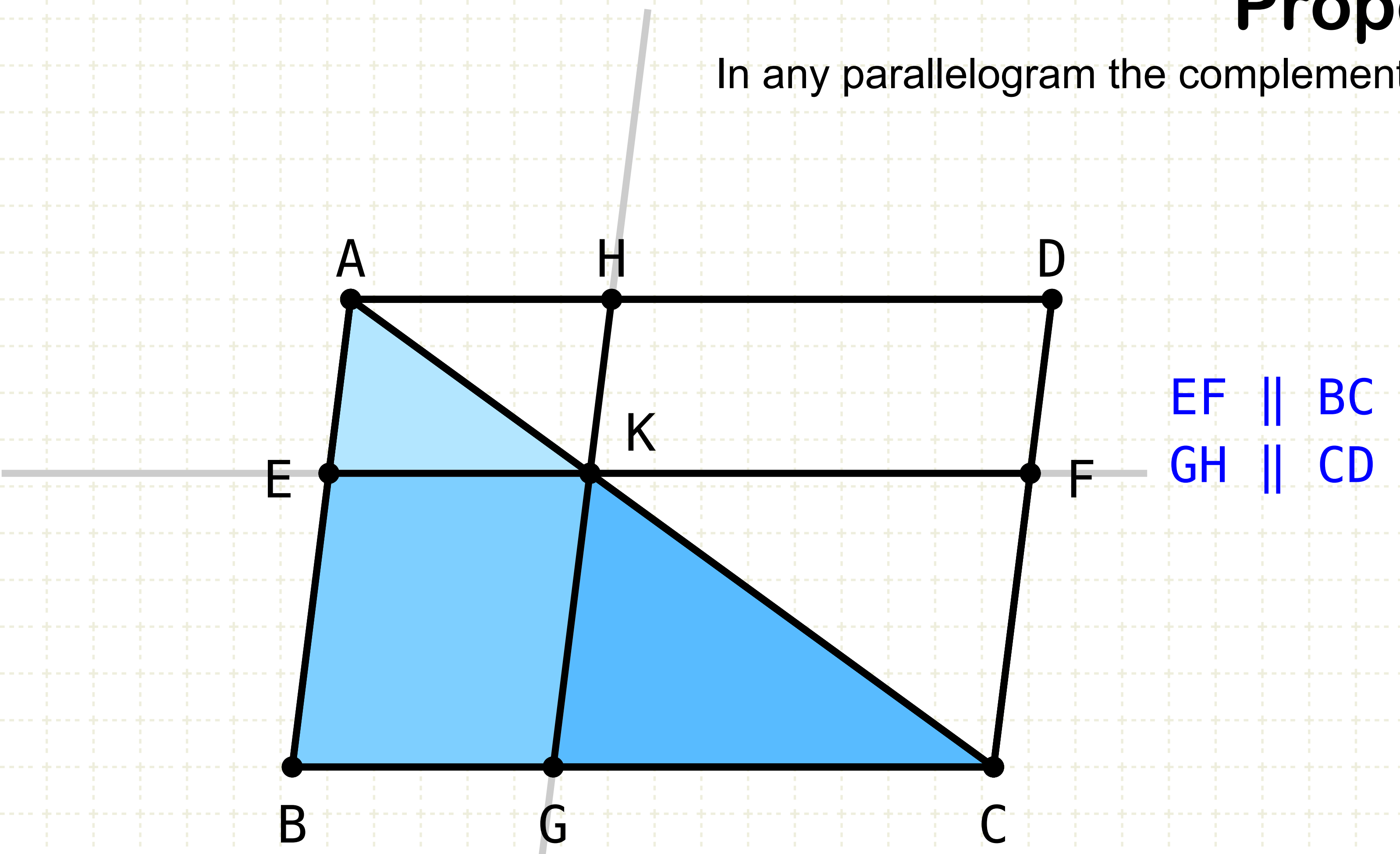


$$\Delta ABC = \Delta ACD$$

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$$\Delta ABC = \Delta AEK + EBGK + \Delta KGC$$

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Triangle ABC is the sum of AED, EBGK and KGC

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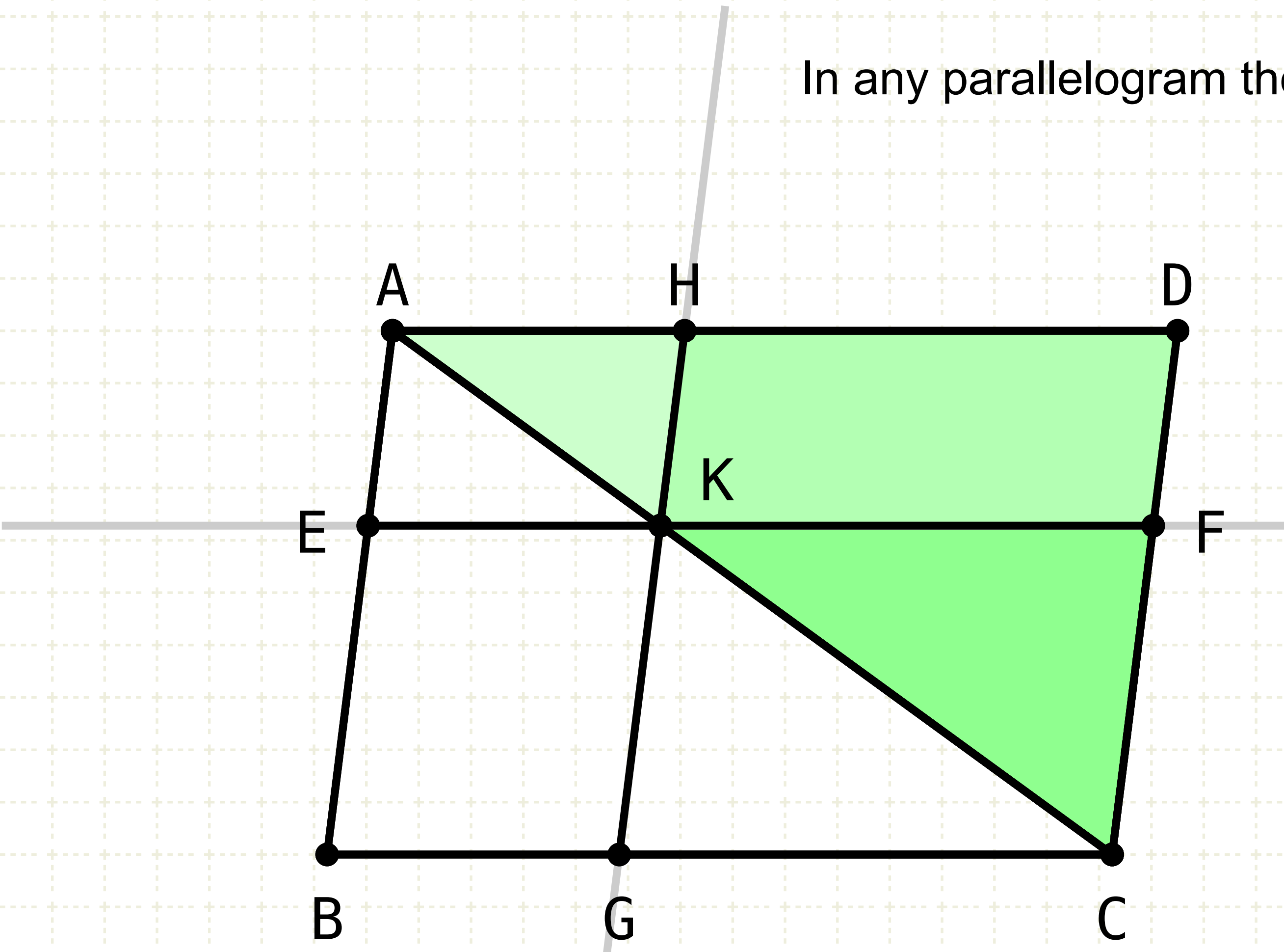


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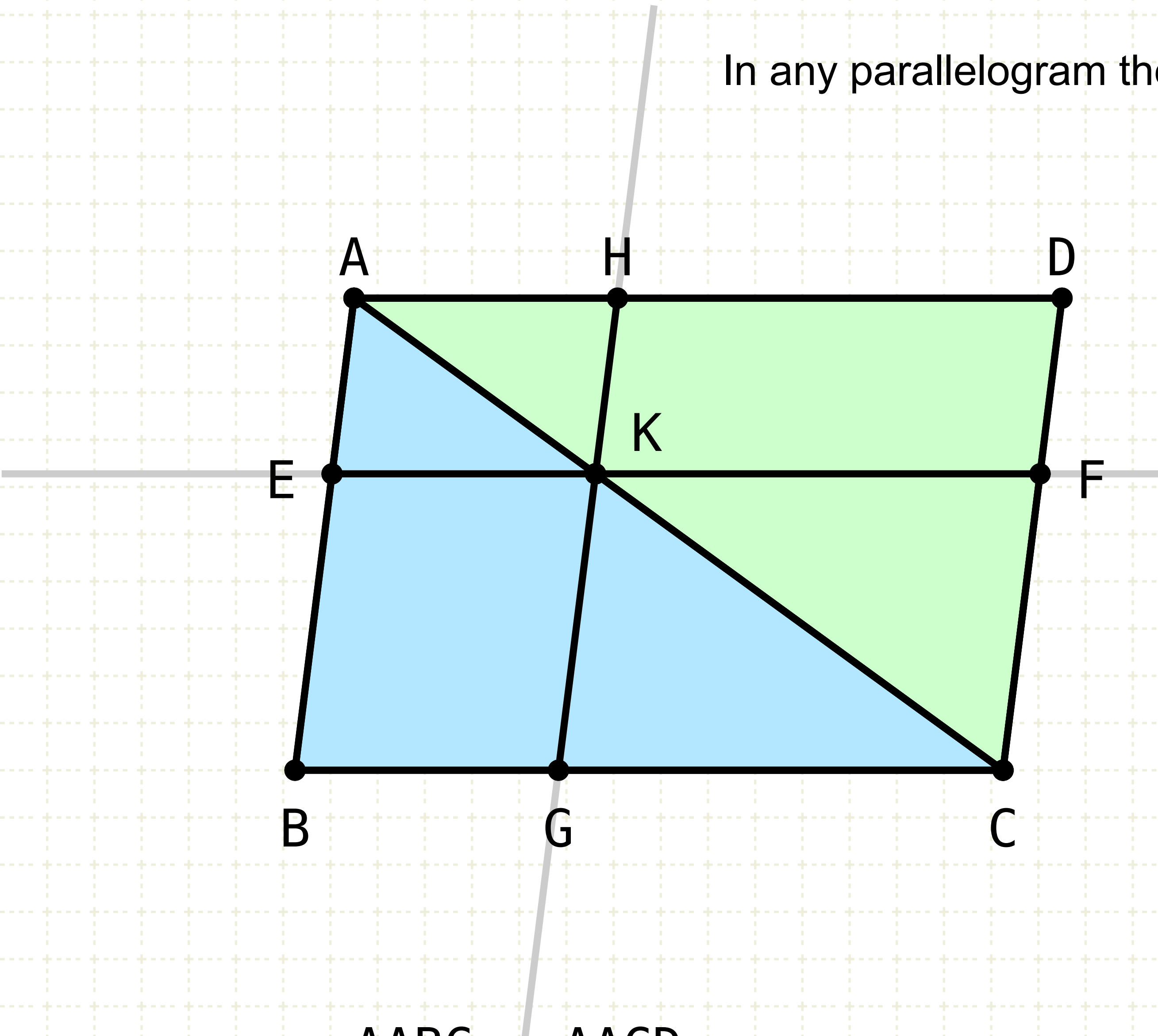


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ΔABC = ΔACD

ΔAEK = ΔAKH,   ΔKGC = ΔKCF

ΔABC = ΔAEK + EBGK + ΔKGC

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Triangle ADC is the sum of AKH, HKFD and KCF

Again, since ABC is equal to ABD, when the equal triangles are subtracted, we are left with the two complements EBGK and HKFD equal to each other

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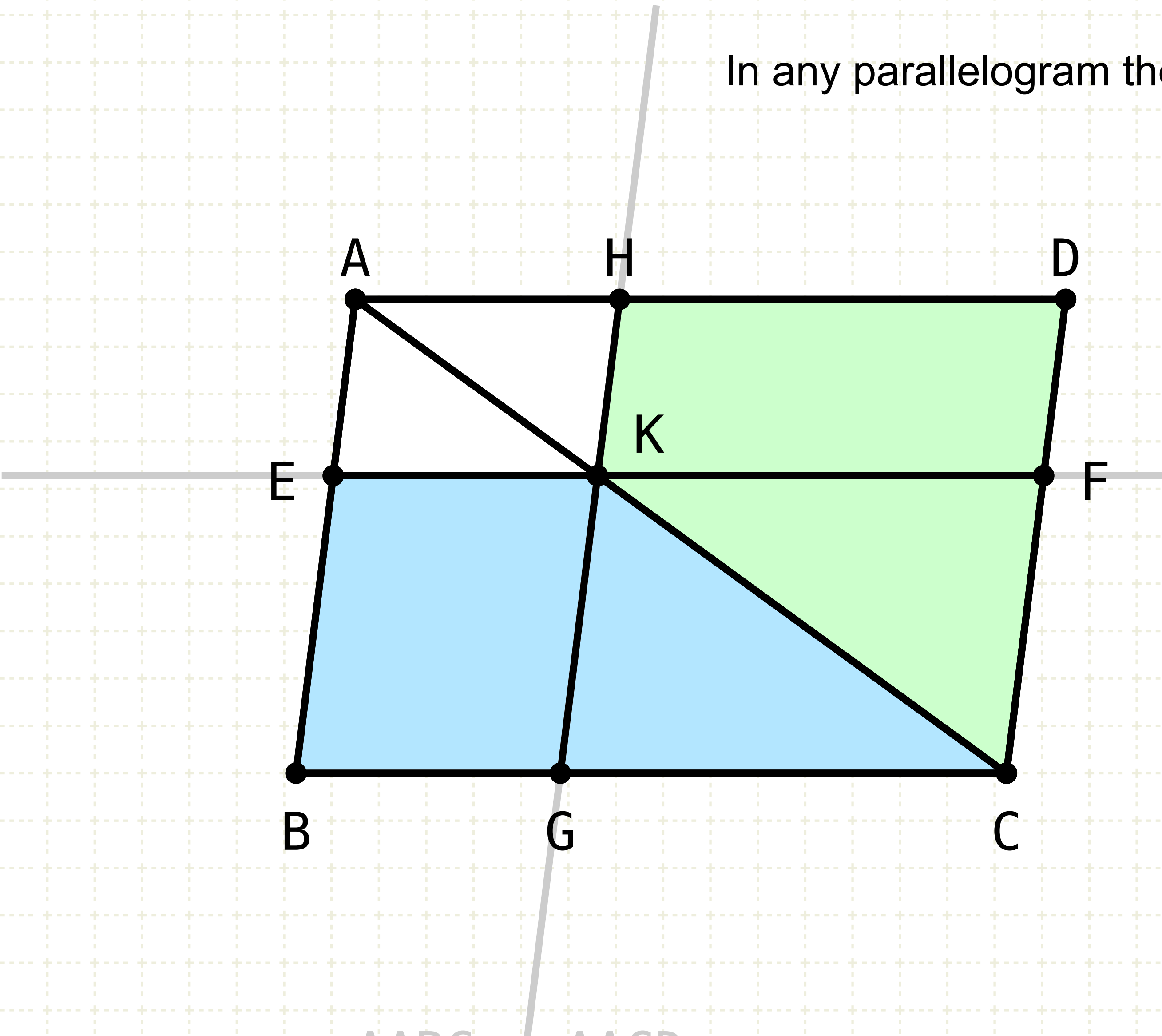


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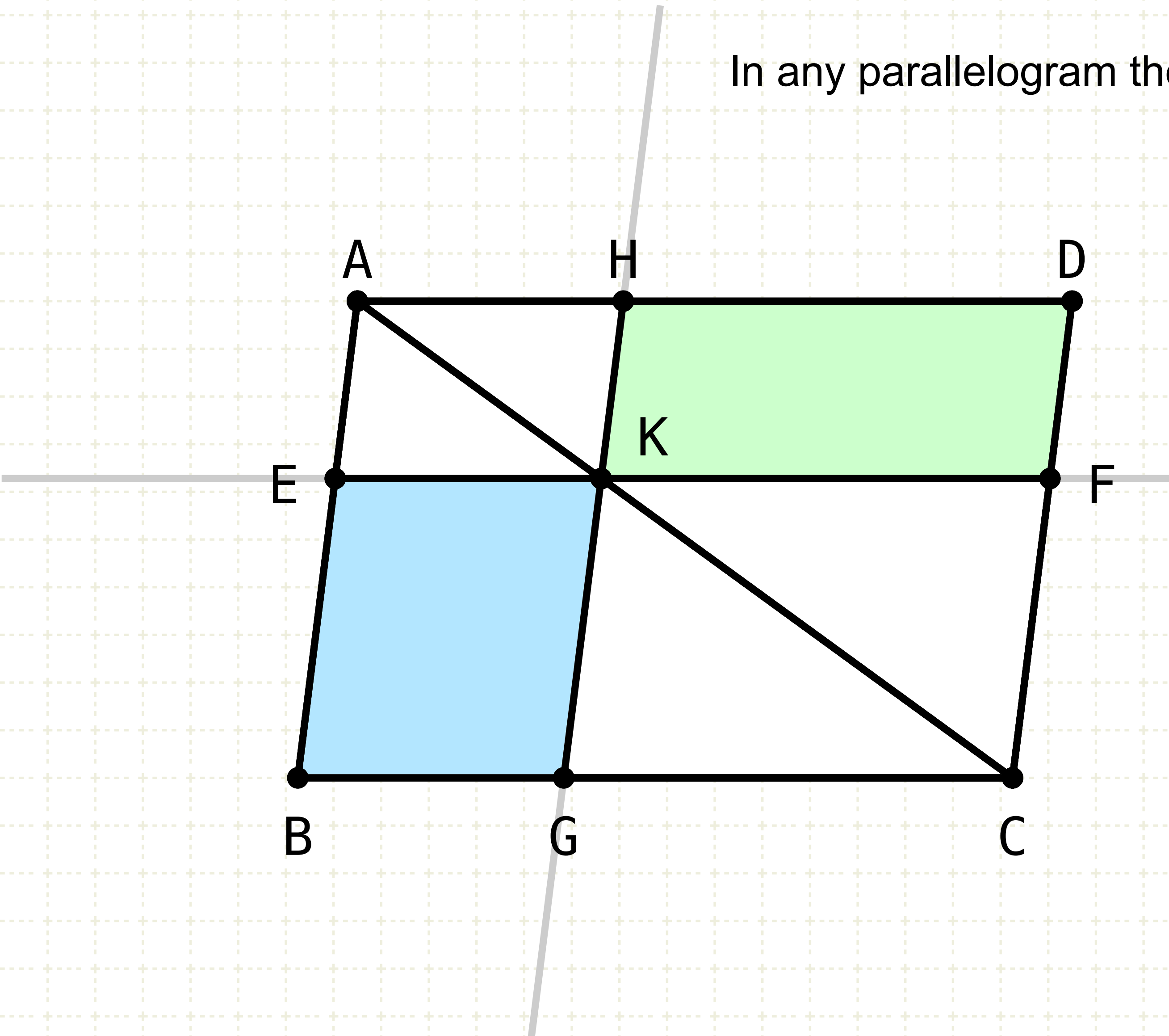


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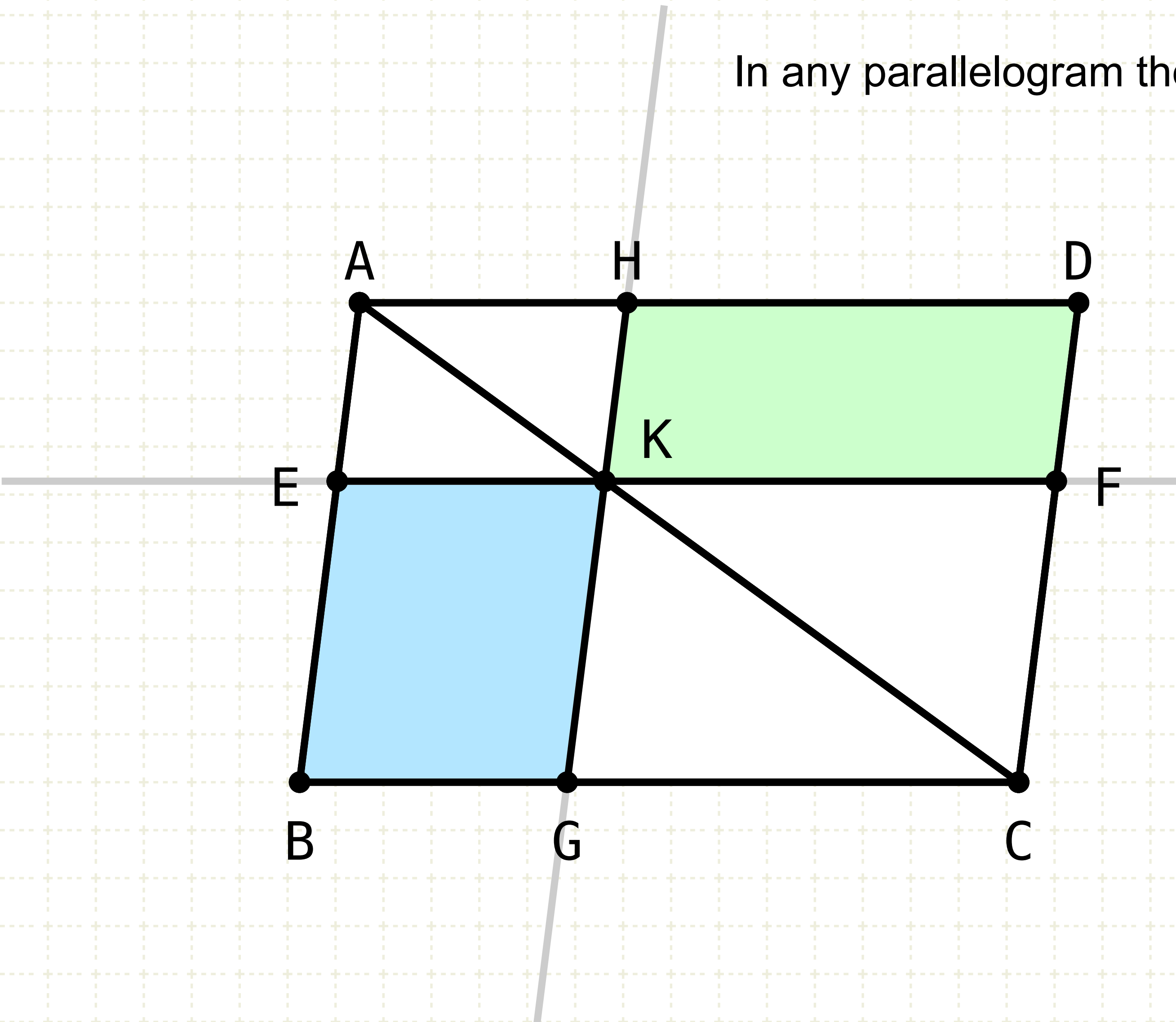


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