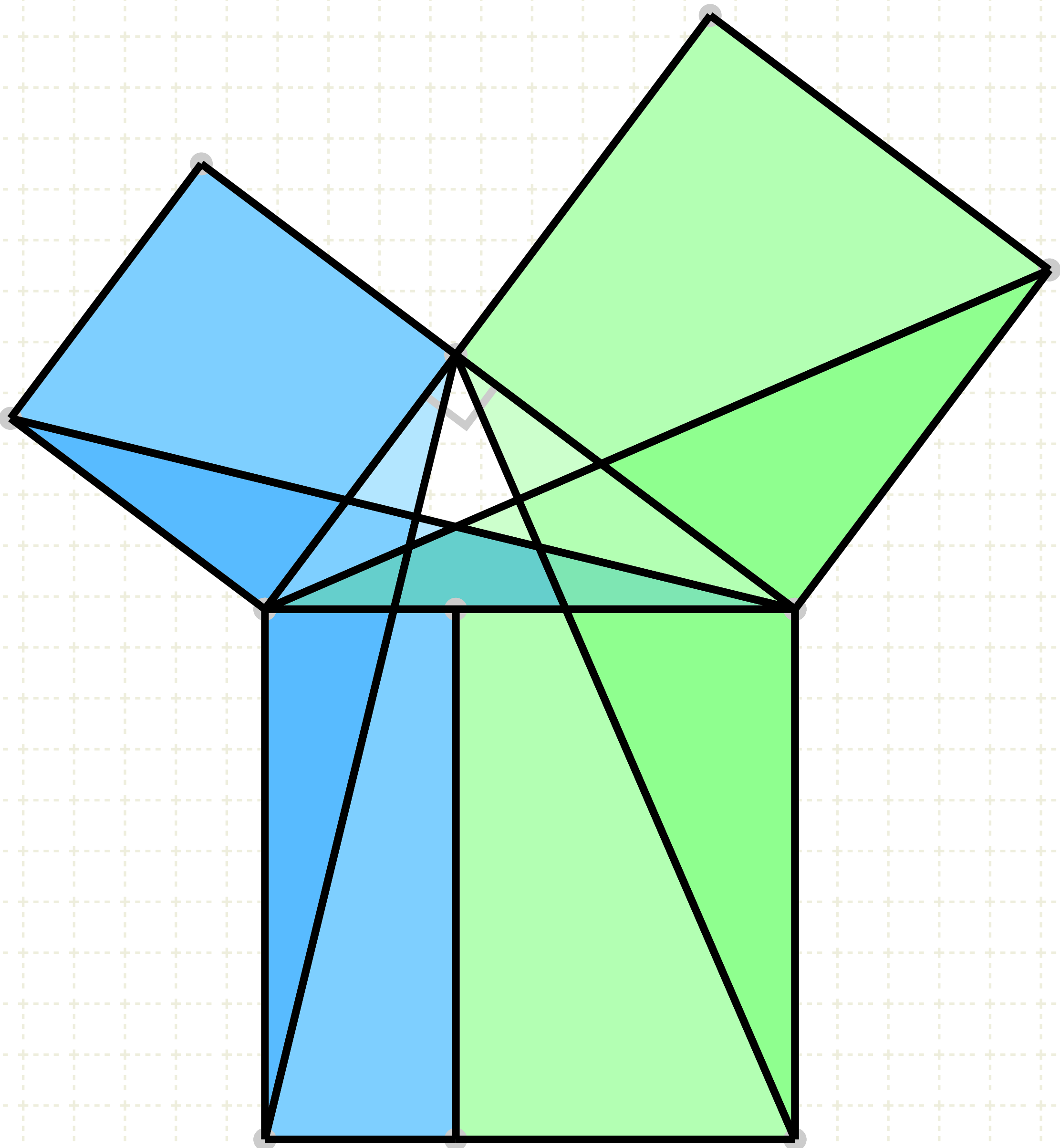
Euclid's Elements

Book I



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

Albert Einstein

Table of Contents, Chapter 1

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Proposition 36 of Book I

Parallelograms which are on equal bases and in the same parallels equal one another.

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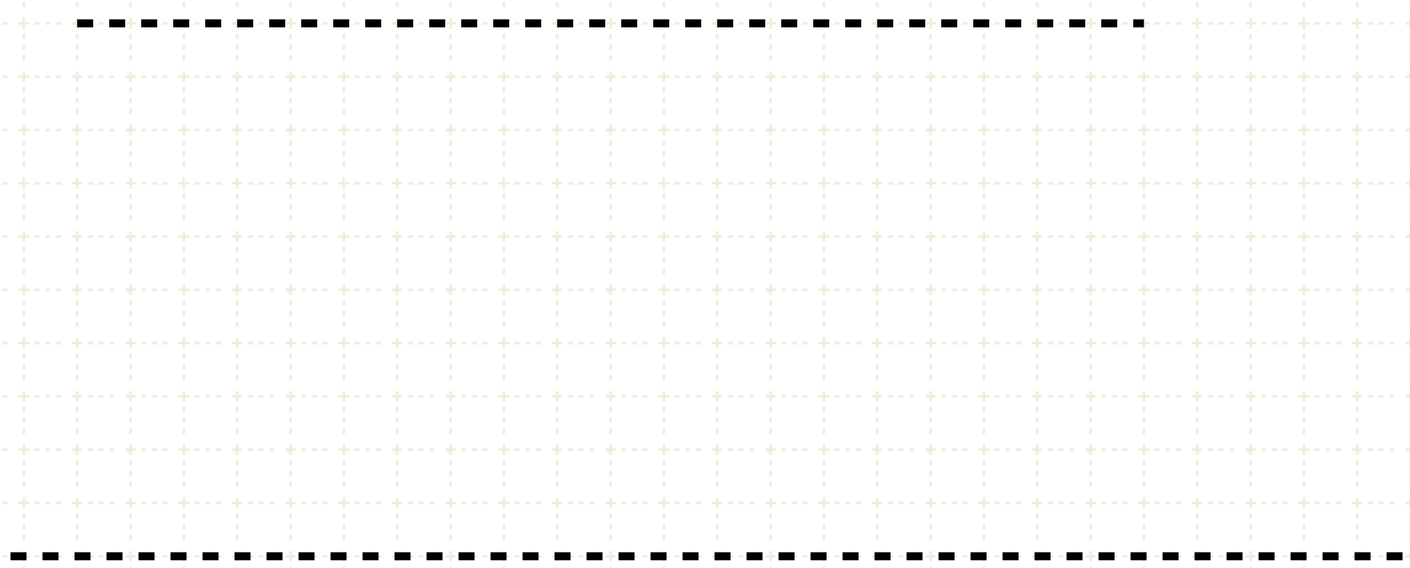


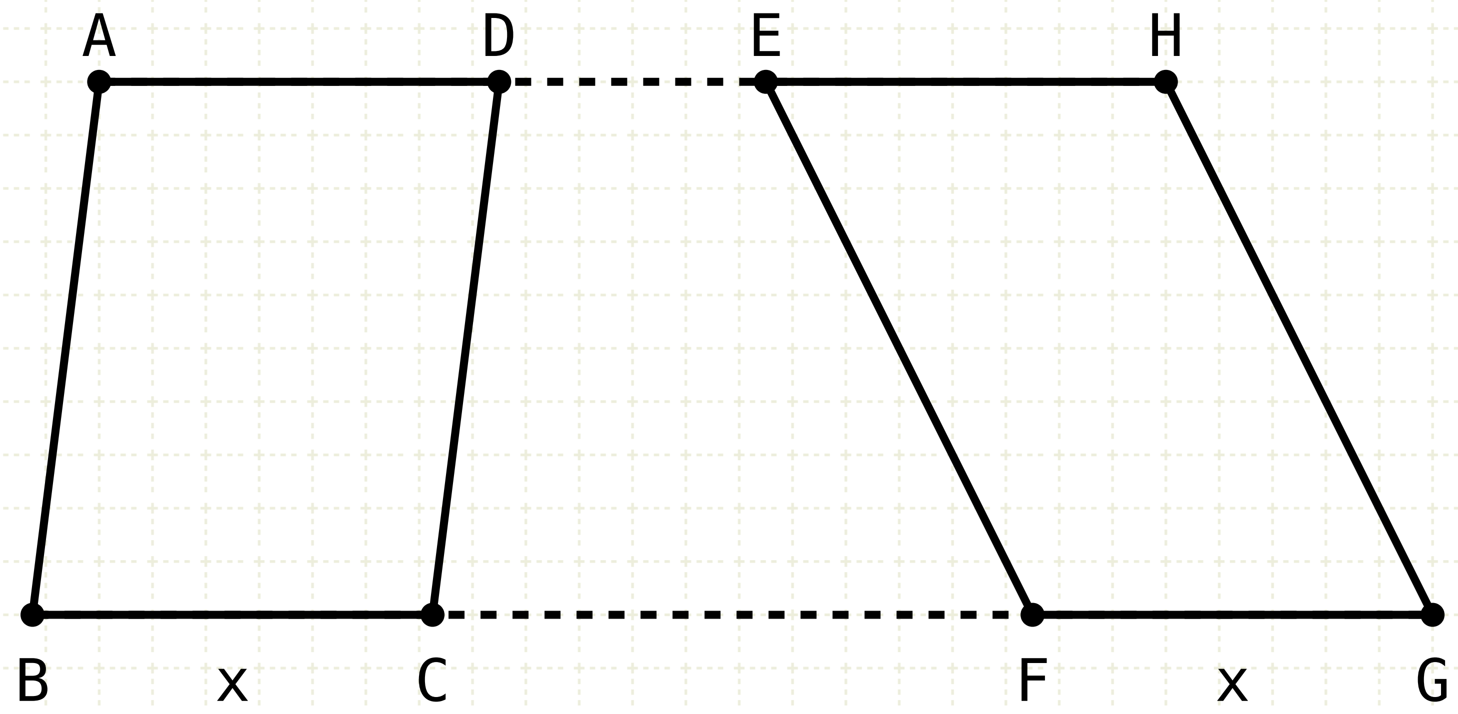
In other words

Parallelograms with equal bases and equal heights have equal area

Given two parallel lines

Proposition 36 of Book I

Parallelograms which are on equal bases and in the same parallels equal one another.



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Parallelograms with equal bases and equal heights have equal area

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Let ABCD and EFGH be parallelograms with equal bases BC and FG on the same parallels AH and BG

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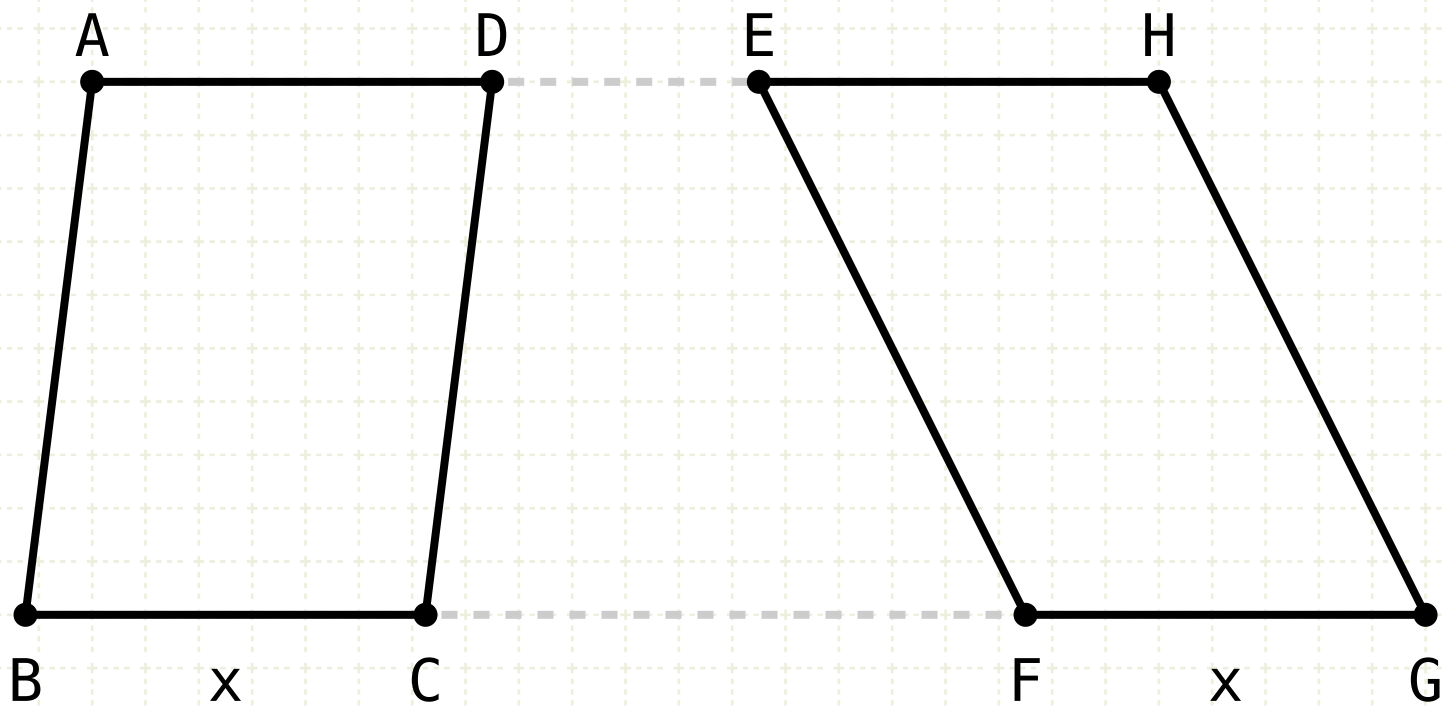

In other words

Parallelograms with equal bases and equal heights have equal area

Given two parallel lines

Let ABCD and EFGH be parallelograms with equal bases BC and FG on the same parallels AH and BG

The area ABCD is equal to EFGH

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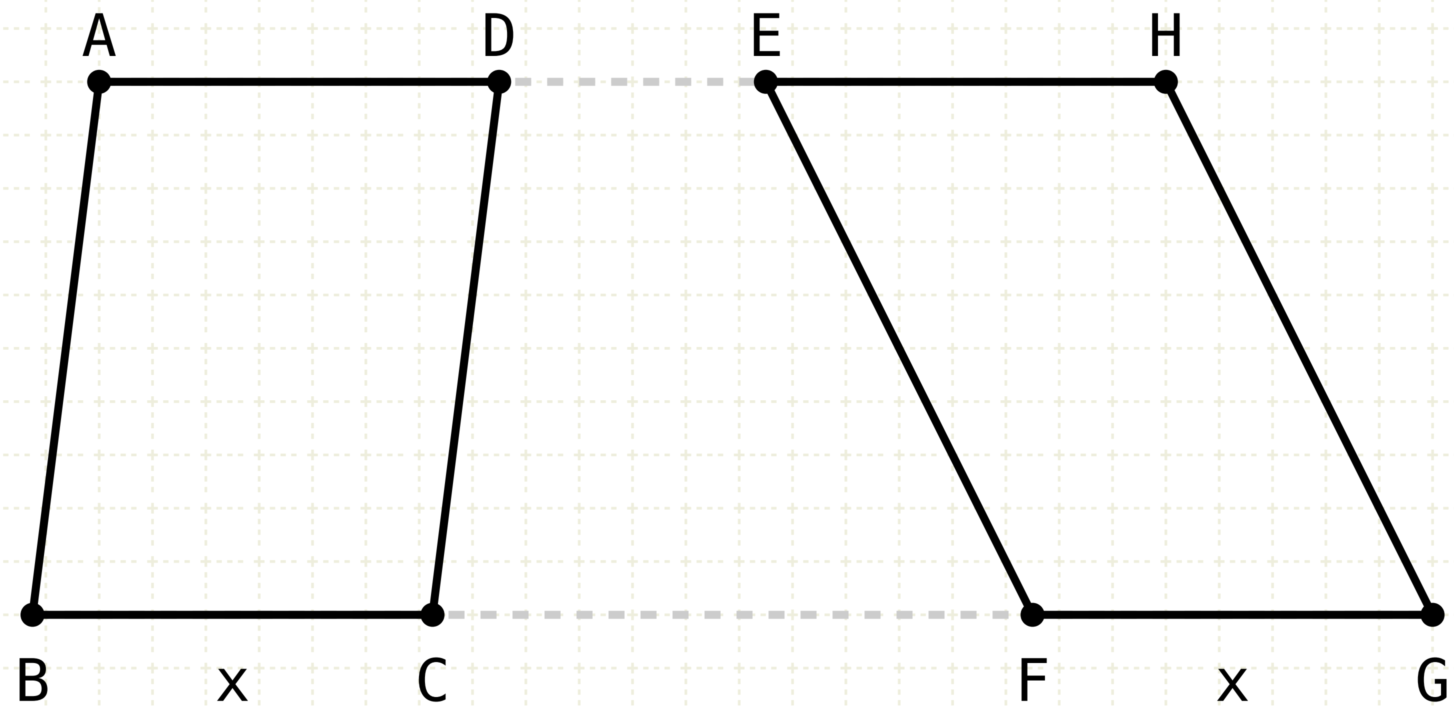

In other words

Parallelograms with equal bases and equal heights have equal area

Given two parallel lines

Let ABCD and EFGH be parallelograms with equal bases BC and FG on the same parallels AH and BG

The area ABCD is equal to EFGH

Proof

Proposition 36 of Book I

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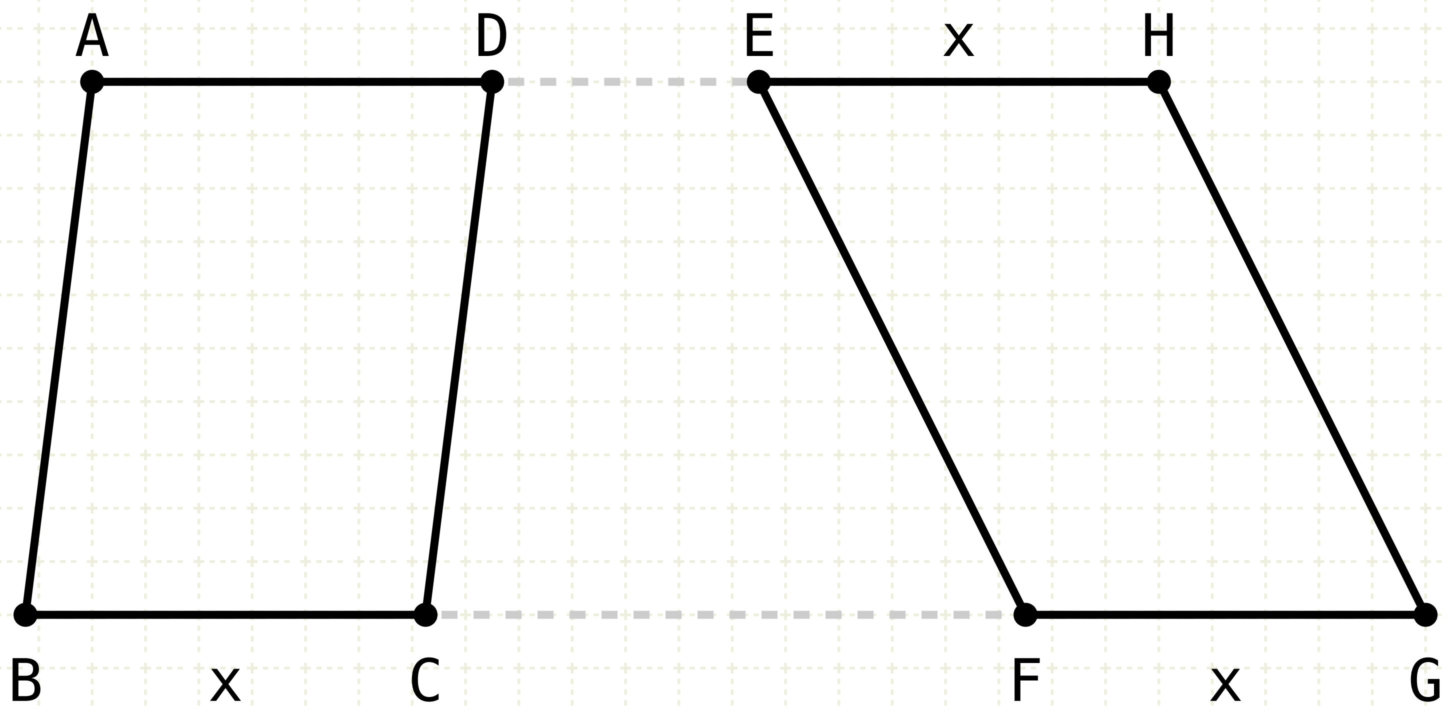

FG = EH = x

In other words

Parallelograms with equal bases and equal heights have equal area

Given two parallel lines

Let ABCD and EFGH be parallelograms with equal bases BC and FG on the same parallels AH and BG

The area ABCD is equal to EFGH

Proof

FG equals EH since EFGH is a parallelogram (I·34)

Proposition 36 of Book I

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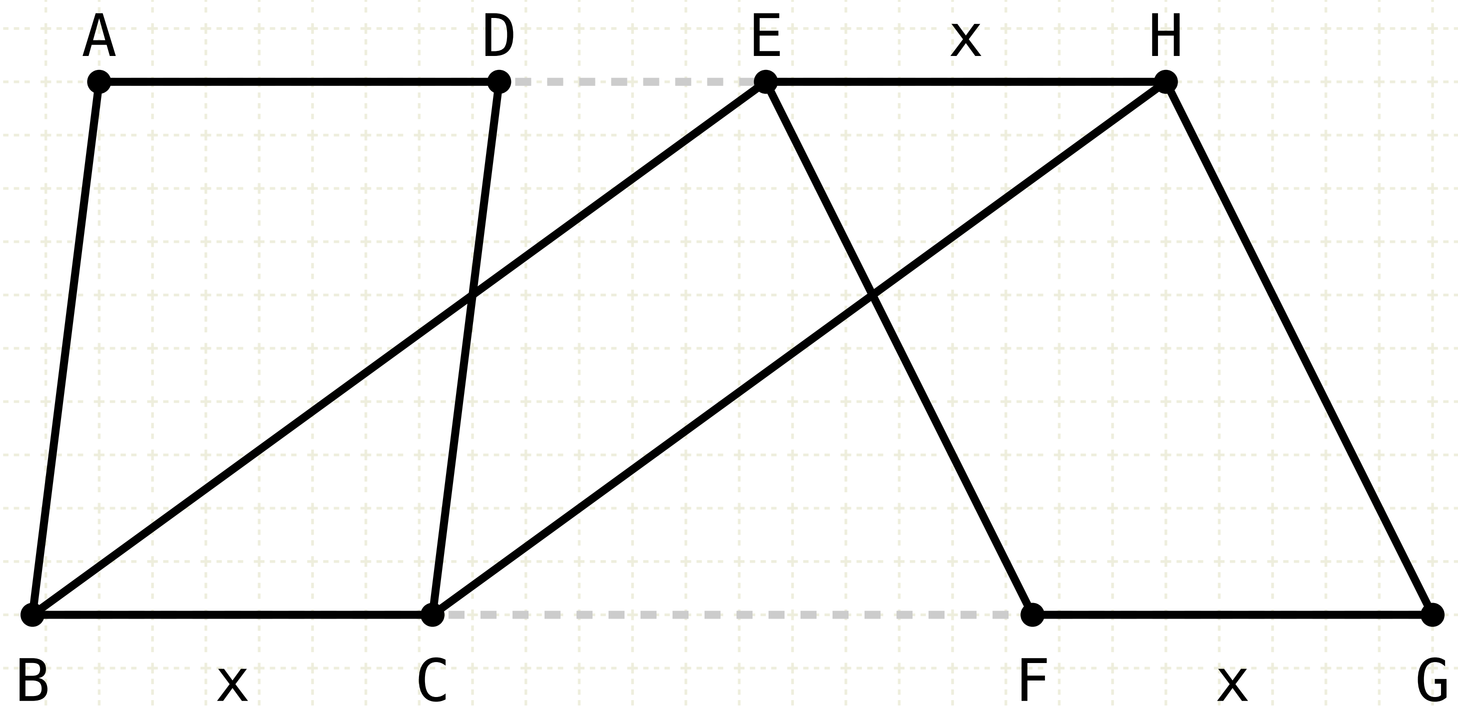

FG = EH = x

In other words

Parallelograms with equal bases and equal heights have equal area

Given two parallel lines

Let ABCD and EFGH be parallelograms with equal bases BC and FG on the same parallels AH and BG

The area ABCD is equal to EFGH

Proof

FG equals EH since EFGH is a parallelogram (I·34)

Create lines BE and CH

Proposition 36 of Book I

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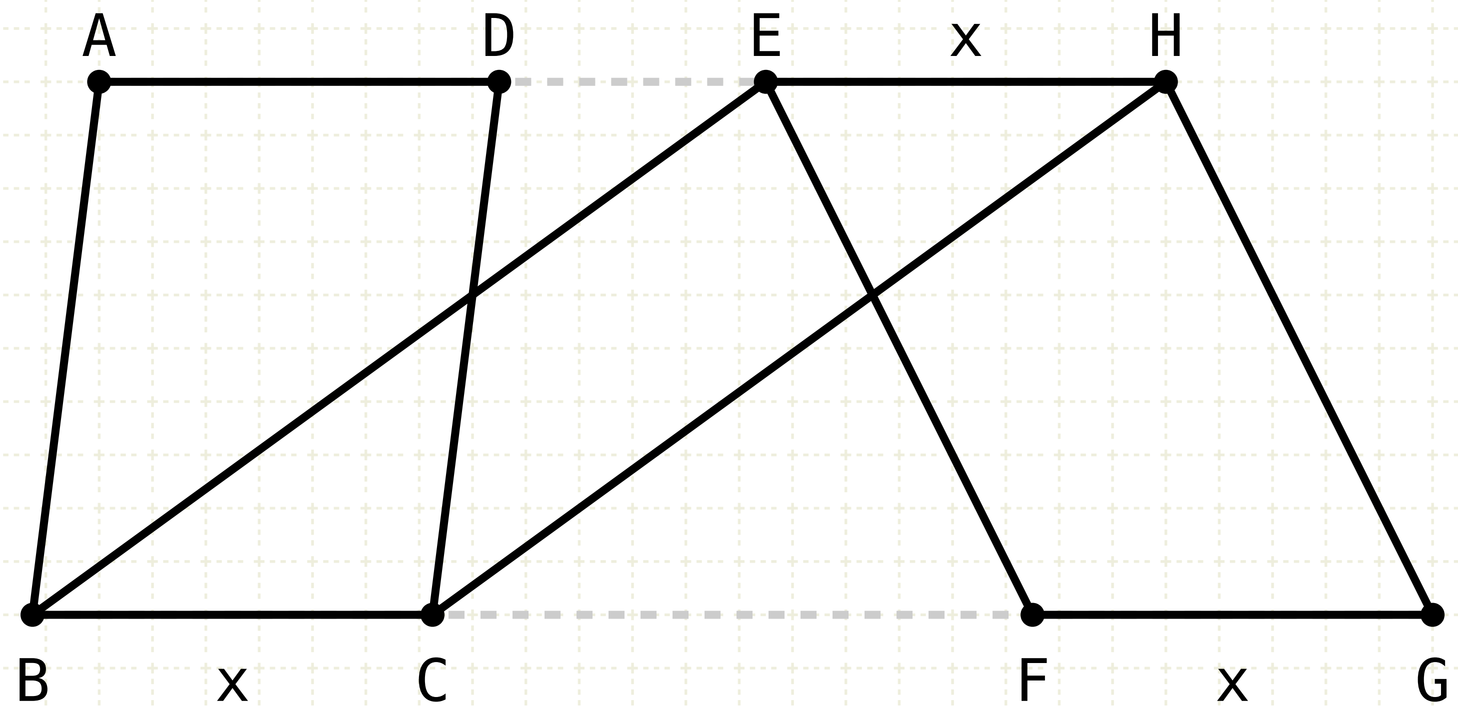

FG = EH = x
BC = FG = EH = x

In other words

Parallelograms with equal bases and equal heights have equal area

Given two parallel lines

Let ABCD and EFGH be parallelograms with equal bases BC and FG on the same parallels AH and BG

The area ABCD is equal to EFGH

Proof

FG equals EH since EFGH is a parallelogram (I·34)

Create lines BE and CH

BC equals FG and FG equals EH, therefore BC equals EH

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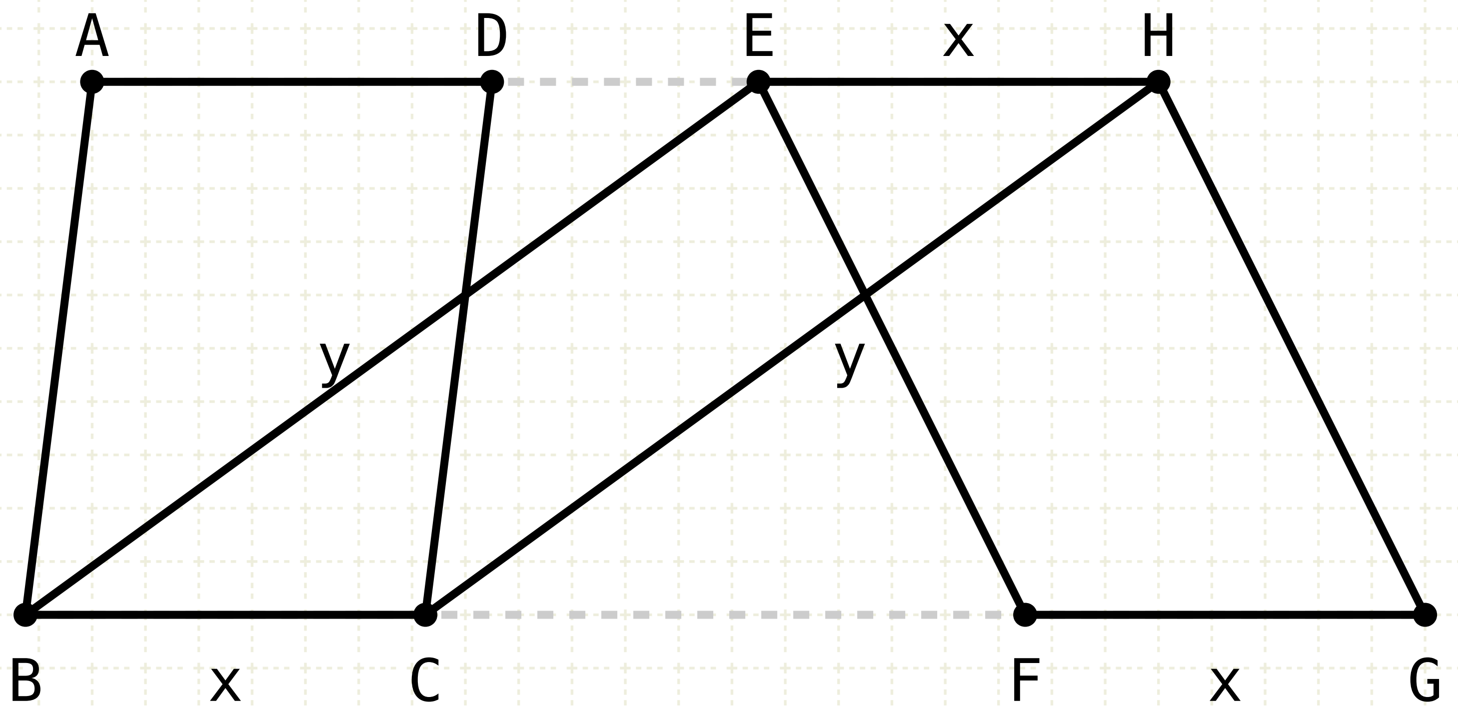

$FG = EH = x$

$BC = FG = EH = x$

$BC \parallel EH \therefore BE \parallel CH$

$BE = CH = y$

In other words

Parallelograms with equal bases and equal heights have equal area

Given two parallel lines

Let ABCD and EFGH be parallelograms with equal bases BC and FG on the same parallels AH and BG

The area ABCD is equal to EFGH

Proof

FG equals EH since EFGH is a parallelogram (I·34)

Create lines BE and CH

BC equals FG and FG equals EH, therefore BC equals EH

BC and EH are parallel, and equal, therefore the lines joining the endpoints are also equal and parallel (I·33), making EBCH a parallelogram

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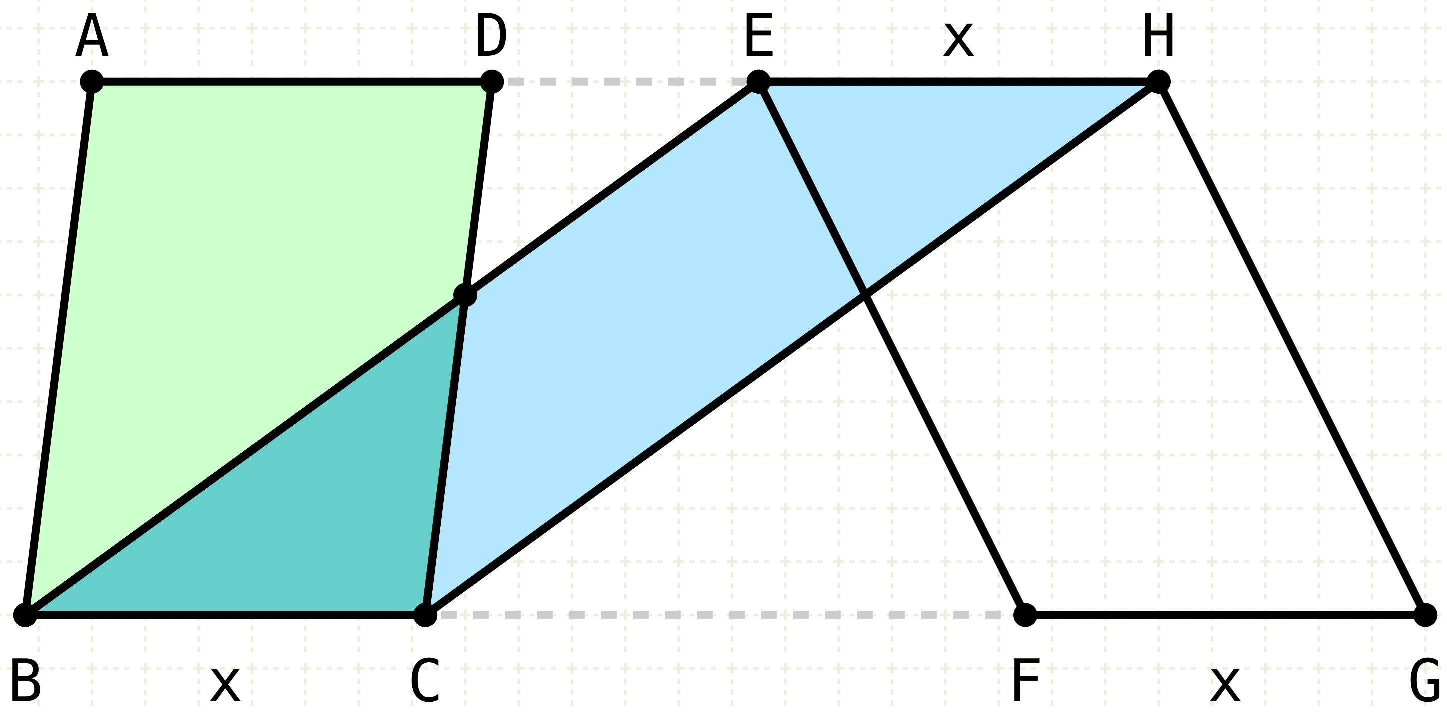

FG = EH = x

BC = FG = EH = x

BC ∥ EH ∴ BE ∥ CH

BE = CH = y

EBCH = ABCD

In other words

Parallelograms with equal bases and equal heights have equal area

Given two parallel lines

Let ABCD and EFGH be parallelograms with equal bases BC and FG on the same parallels AH and BG

The area ABCD is equal to EFGH

Proof

FG equals EH since EFGH is a parallelogram (I·34)

Create lines BE and CH

BC equals FG and FG equals EH, therefore BC equals EH

BC and EH are parallel, and equal, therefore the lines joining the endpoints are also equal and parallel (I·33), making EBCH a parallelogram

ABCD and EBCH are parallelograms which share the same base and are on the same parallels, so their areas are equal (I·35)

Proposition 36 of Book I

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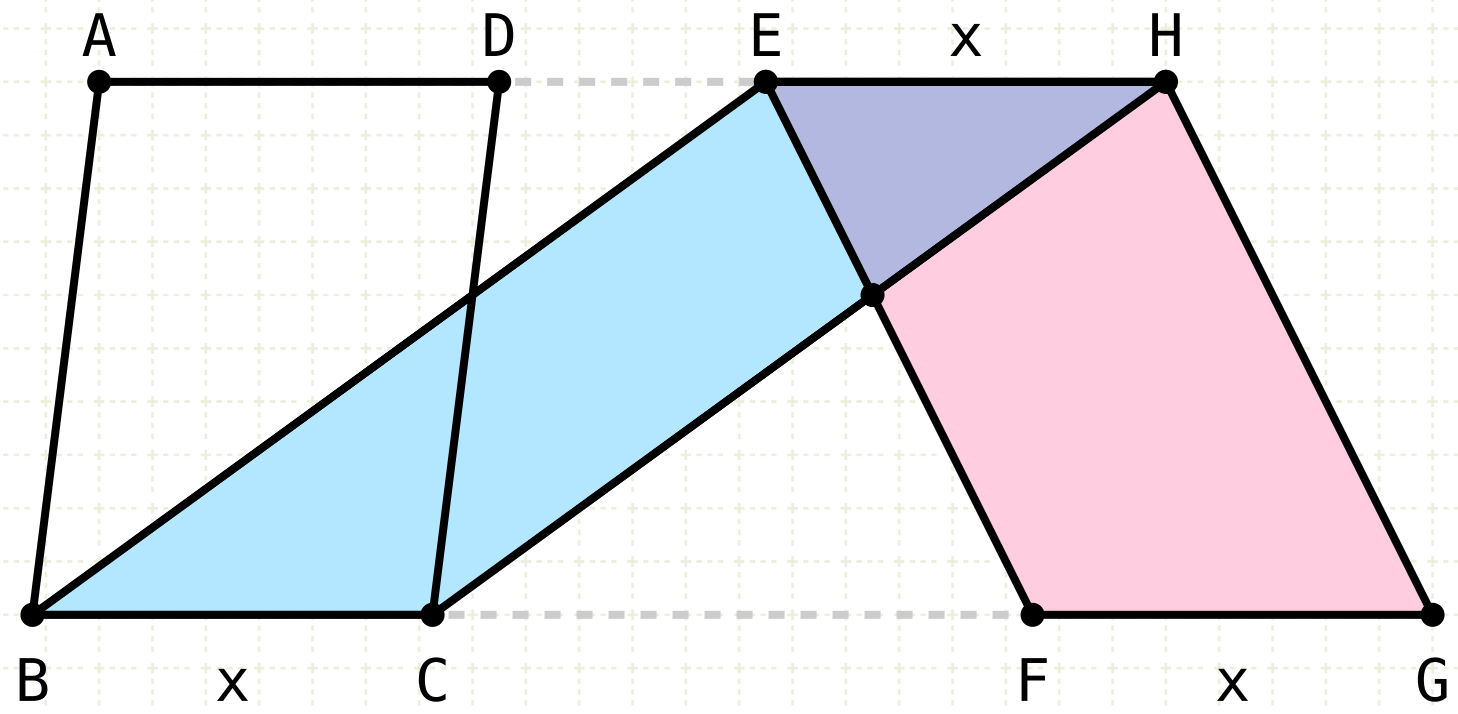

FG = EH = x
BC = FG = EH = x
BC ∥ EH ∴ BE ∥ CH
BE = CH = y
EBCH = ABCD
EFGH = EBCH

In other words

Parallelograms with equal bases and equal heights have equal area

Given two parallel lines

Let ABCD and EFGH be parallelograms with equal bases BC and FG on the same parallels AH and BG

The area ABCD is equal to EFGH

Proof

FG equals EH since EFGH is a parallelogram (I·34)

Create lines BE and CH

BC equals FG and FG equals EH, therefore BC equals EH

BC and EH are parallel, and equal, therefore the lines joining the endpoints are also equal and parallel (I·33), making EBCH a parallelogram

ABCD and EBCH are parallelograms which share the same base and are on the same parallels, so their areas are equal (I·35)

Similarly, EBCH and EFGH are parallelograms which share the same base and are on the same parallels, so their areas are equal (I·35)

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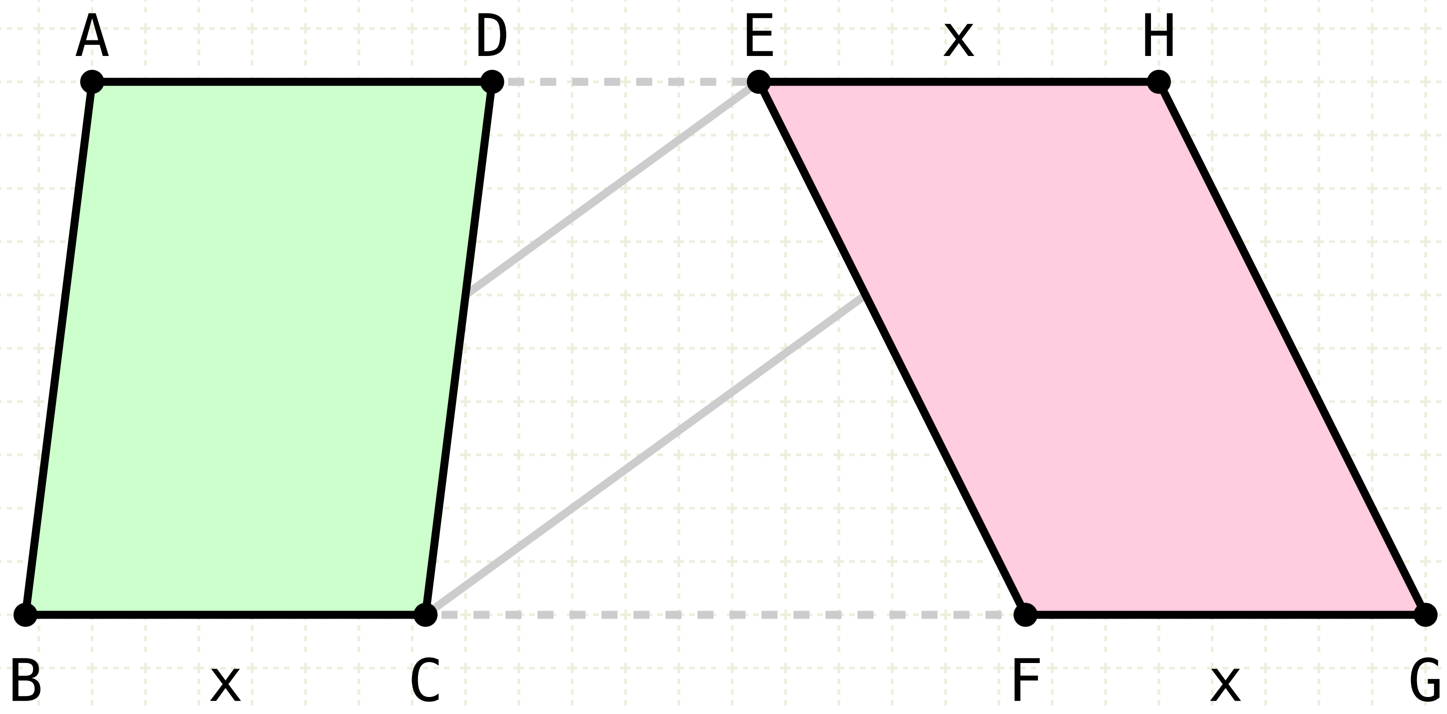
Parallelograms which are on equal bases and in the same parallels equal one another.



FG = EH = x
BC = FG = EH = x
BC || EH ∴ BE || CH
BE = CH = y
EBCH = ABCD
EFGH = EBCH

ABCD = EFGH

In other words

Parallelograms with equal bases and equal heights have equal area

Given two parallel lines

Let ABCD and EFGH be parallelograms with equal bases BC and FG on the same parallels AH and BG

The area ABCD is equal to EFGH

Proof

FG equals EH since EFGH is a parallelogram (I·34)

Create lines BE and CH

BC equals FG and FG equals EH, therefore BC equals EH

BC and EH are parallel, and equal, therefore the lines joining the endpoints are also equal and parallel (I·33), making EBCH a parallelogram

ABCD and EBCH are parallelograms which share the same base and are on the same parallels, so their areas are equal (I·35)

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Therefore ABCD is equal to EFGH

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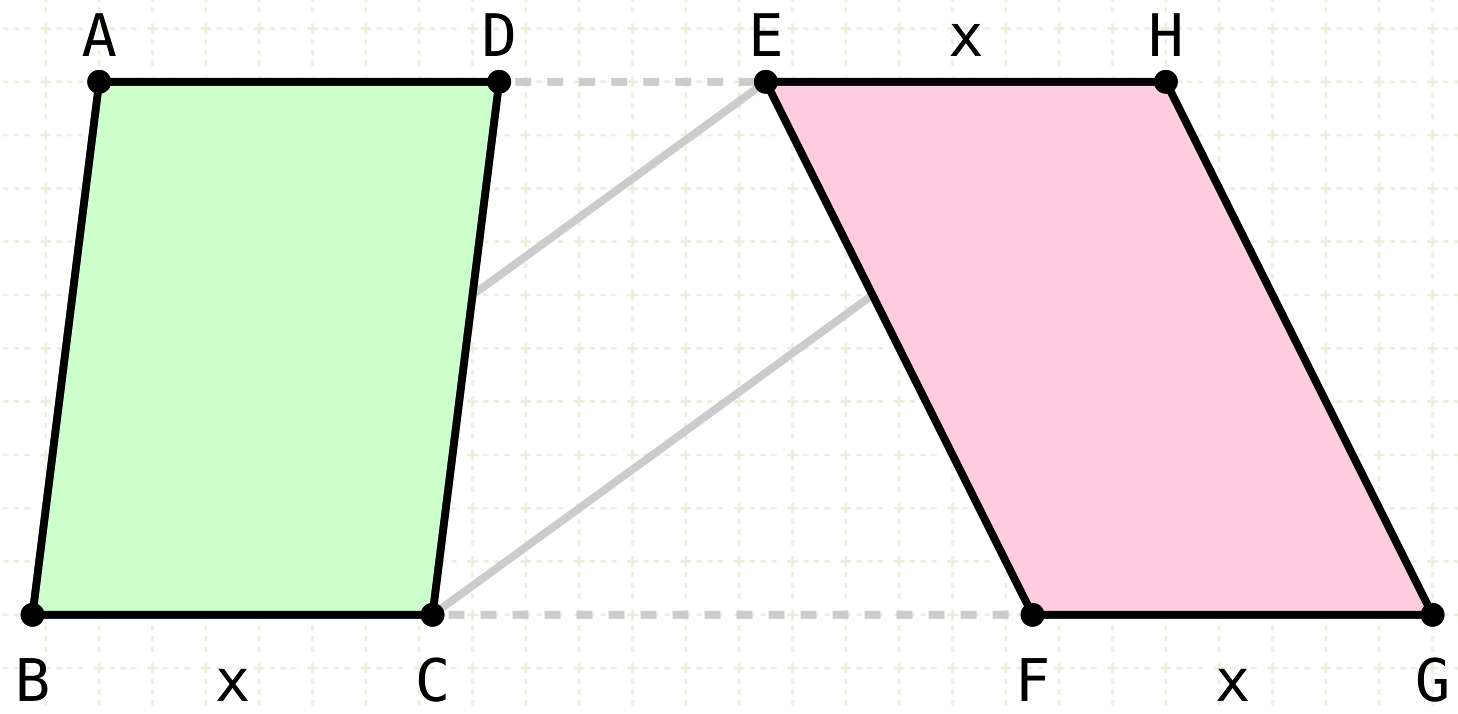

FG = EH = x
BC = FG = EH = x
BC ∥ EH ∴ BE ∥ CH
BE = CH = y
EBCH = ABCD
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ABCD = EFGH

In other words

Parallelograms with equal bases and equal heights have equal area

Given two parallel lines

Let ABCD and EFGH be parallelograms with equal bases BC and FG on the same parallels AH and BG

The area ABCD is equal to EFGH

Proof

FG equals EH since EFGH is a parallelogram (I·34)

Create lines BE and CH

BC equals FG and FG equals EH, therefore BC equals EH

BC and EH are parallel, and equal, therefore the lines joining the endpoints are also equal and parallel (I·33), making EBCH a parallelogram

ABCD and EBCH are parallelograms which share the same base and are on the same parallels, so their areas are equal (I·35)

Similarly, EBCH and EFGH are parallelograms which share the same base and are on the same parallels, so their areas are equal (I·35)

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