

Secondary Math 2A

Unit 6A Lesson 24-25: Diagonals of a Parallelogram

Vocabulary:

Bisect: divide into two equal parts

Bisector: the line that divides something into equal parts

Diagonal: a line segment that connects two non-consecutive vertices of a shape

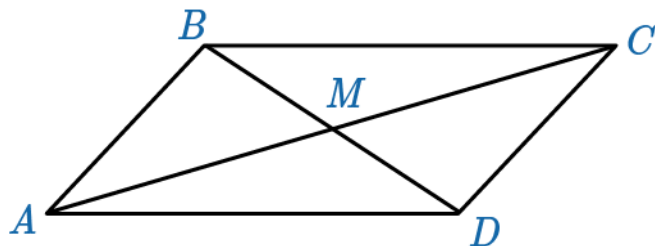
Parallelogram: a quadrilateral with two pairs of opposite parallel sides

Diagonals of a Parallelogram:

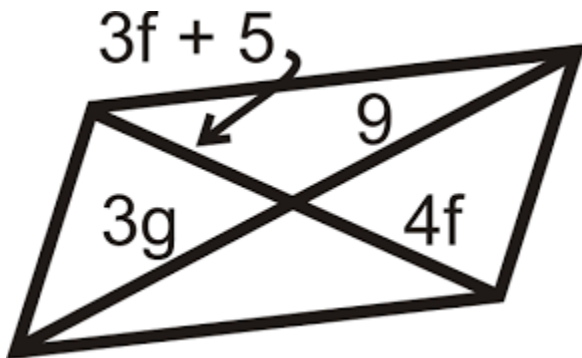
The diagonals of a parallelogram have a special property, they bisect each other. This means they cut each other into two equal pieces. The diagonals themselves are not necessarily the same, unless it is a rectangle, but more on that later.

Prove: Diagonals of a Parallelogram bisect each other

Given: Parallelogram ABCD



Using this Theorem



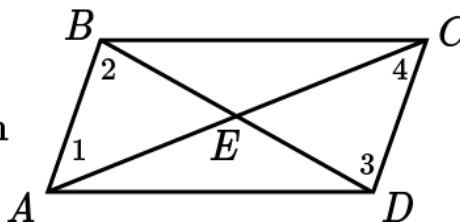
Example Quick Check Problems

- 1) What is true about the diagonals of ALL parallelograms?

- 2) What is the error in the proof of the Diagonals of a Parallelogram Theorem below

Given: $\square ABCD$

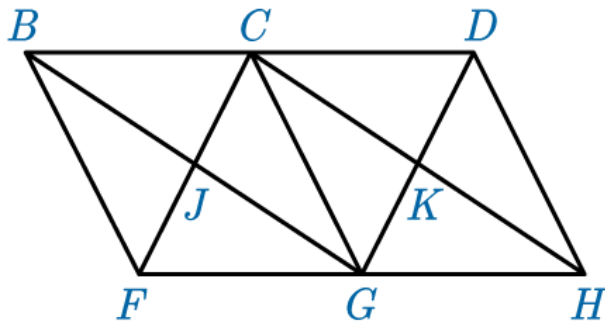
Prove: \overline{AC} and \overline{BD} bisect each other at E .



Statements	Reasons
$ABCD$ is a parallelogram	Given
$\overline{AB} \parallel \overline{DC}$	Definition of a Parallelogram
$\angle 1 \cong \angle 4, \angle 2 \cong \angle 3$	Alternate Interior Angles Theorem
$\overline{AB} \cong \overline{DC}$	Opposite Sides of a Parallelogram are Congruent
$\triangle ABE \cong \triangle CED$	SAS Congruency
$\overline{BE} \cong \overline{DE}, \overline{AE} \cong \overline{CE}$	CPCTC
\overline{AC} and \overline{BD} bisect each other	Definition of a Bisector

- 3) WXYZ is a parallelogram, the diagonals of the parallelogram meet at point A. John states that he knows $\overline{WA} \cong \overline{XA}$. Is John correct?

- 4) Given that $\overline{FG} \cong \overline{GH}$ in the diagram below, list all segments that you know must be congruent to \overline{KH} .



- 5) Is the following statement sometimes true, always true, or never true?

In parallelogram WXYZ with diagonals that meet at point A, we know that $WA = \frac{1}{2}WY$.