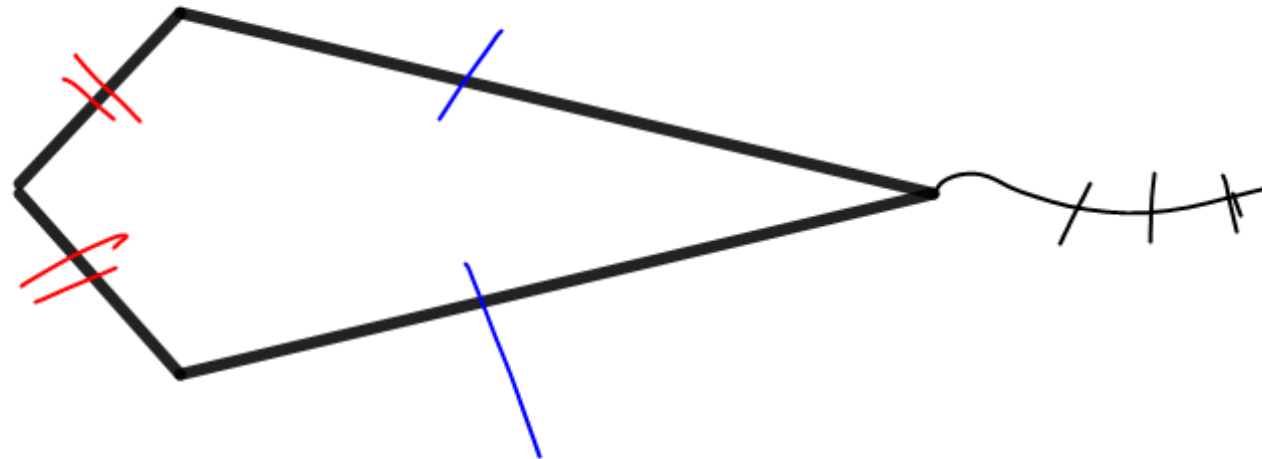


Proving Quadrilateral Properties...

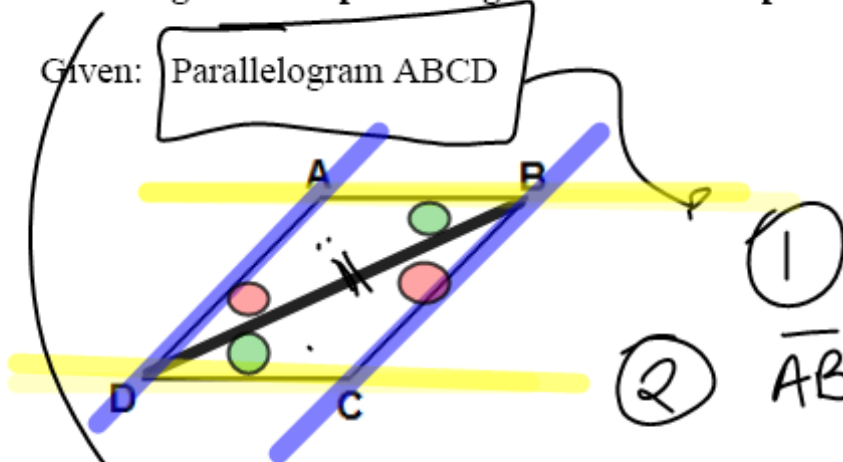
With the definitions below, we can prove the various properties of quadrilaterals.

- 1.) Parallelogram: A quadrilateral that has two pairs of parallel sides.
- 2.) Rectangle: A quadrilateral with four right angles.
- 3.) Rhombus: A quadrilateral with four congruent sides.
- 4.) Square: A quadrilateral with four right angles and four congruent sides.
- 5.) Kite: A quadrilateral with two pairs of congruent, adjacent sides and its opposite sides are not congruent.



I. A diagonal of a parallelogram divides the parallelogram into two congruent triangles.

Given: Parallelogram ABCD



Proof:

S | R

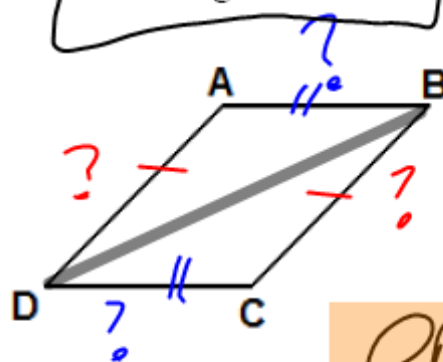
- ①
- ② $\overline{AB} \parallel \overline{CD}$; $\overline{AD} \parallel \overline{BC}$
- ③ $\overline{BD} \cong \overline{DB}$
- ④ $\angle ABD \cong \angle BDC$
 $\angle ADB \cong \angle CBD$
- ⑤ $\triangle ABD \cong \triangle CDB$

QED

- ① Given
- ② Def of p-gram
- ③ Reflexive
- ④ Alt. Int. \angle s
- ⑤ ASA
(3, 4, 4)

II. Opposite sides of a parallelogram are congruent.

Given: Parallelogram ABCD



POP

Proof:

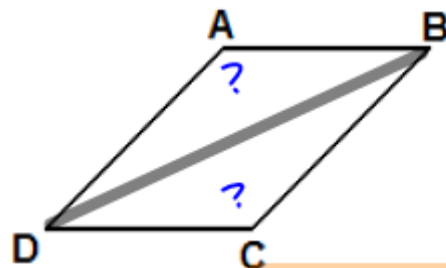
- ①
- ② $\triangle ABD \cong \triangle CDB$
- ③ $\overline{AB} \cong \overline{DC}$
 $\overline{AD} \cong \overline{BC}$

S | R

- ① Given
- ② POP
- ③ PCP

III. Opposite angles of a parallelogram are congruent.

Given: Parallelogram ABCD



POP

Proof:

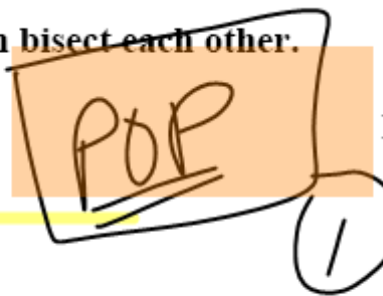
- ①
- ② $\triangle ABD \cong \triangle CDB$
- ③ $\angle A \cong \angle C$

S | R

- ① Given
- ② POP
- ③ PCP

V. Diagonals of a parallelogram bisect each other.

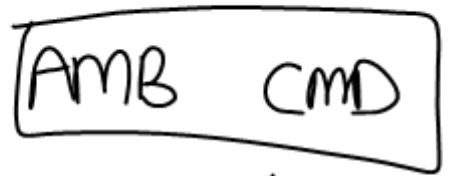
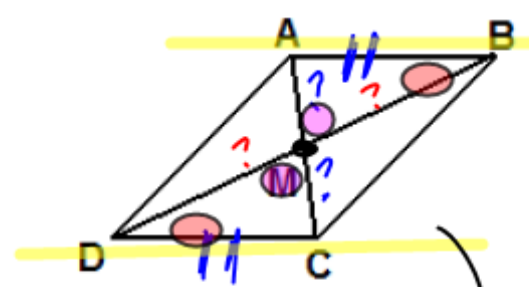
Given: Parallelogram ABCD



Proof:

S

R



②

$\angle AMB \cong \angle CMD$

③

$\overline{AB} \cong \overline{CD}$

④

$\overline{AB} \parallel \overline{CD}; \overline{AD} \parallel \overline{BC}$

⑤

$\angle ABD \cong \angle BDC$

⑥

$\triangle AMB \cong \triangle CMD$

⑦

$\overline{AM} \cong \overline{MC}; \overline{BM} \cong \overline{MD}$

⑧

Diagonals bisect each other

① Given

② VAT

③ POP

④ Def of P-gram

⑤ Alt. Int. \angle s

⑥ AAS (2, 5, 3)

⑦ PCP

⑧ Def of Bisector