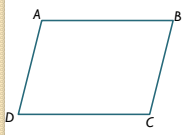
§6-2 Tests for Parallelograms

- Test to see if a quadrilateral IS a parallelogram.
- Best way to test?
  - Let's check the converses of the theorems about parallelograms!
  - If the hypothesis of the converse provides enough information to conclude opposite sides are parallel (the def. of a parallelogram) then the converse is valid.

1) If a quad. is a ||ogram ⇒ consecutive ∠s are supp.

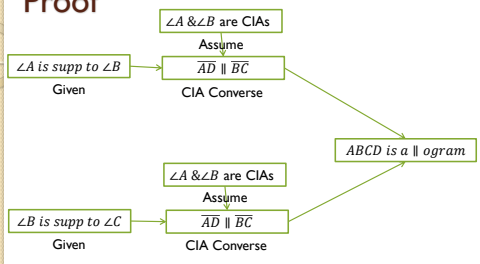
- Converse?
  - If consecutive ∠s of a quad. are supp. ⇒ it is a ||ogram.
  - Is this true? If so, let's prove it!



Given: $\angle A$ and $\angle B$ are supplementary
$\angle A$ and $\angle D$ are supplementary
$\angle B$ and $\angle C$ are supplementary
$\angle C$ and $\angle D$ are supplementary

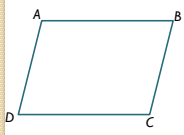
Prove: $ABCD$ is a ||ogram

Proof



2) If a quad is a ∥ogram, ⇒ opp. ∠s are ≅

- Converse?
  - If the opp. ∠s of a quad. are ≅⇒ it is a ∥ogram.



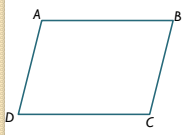
Given: $\angle A \cong \angle C$
$\angle B \cong \angle D$

Prove: $ABCD$ is a ∥ogram

You will prove this theorem for homework!

3) If a quad is a ∥ogram, ⇒ opp. sides are ≅

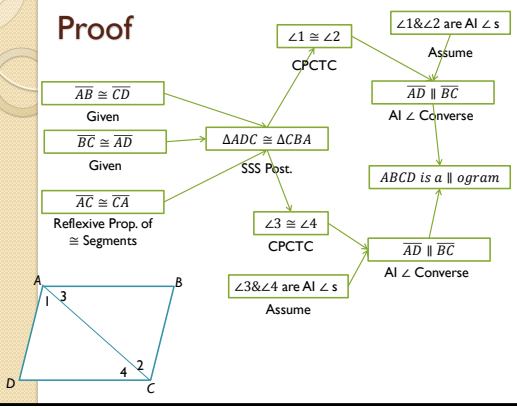
- Converse?
  - If the opp. sides of a quad. are ≅⇒ it is a ∥ogram.



Given: $\overline{AB} \cong \overline{CD}$
$\overline{BC} \cong \overline{AD}$

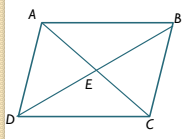
Prove: $ABCD$ is a ∥ogram

Proof



4) If a quad is a ||ogram, ⇒ diag's bisect each other

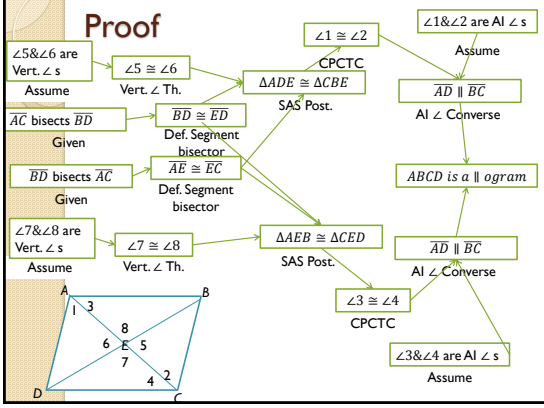
- Converse?
  - If the diag's of a quad. bisect each other ⇒ it is a ||ogram.



Given: $\overline{AC}$ bisects $\overline{BD}$
$\overline{BD}$ bisects $\overline{AC}$

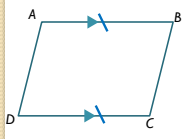
Prove: $ABCD$ is a ||ogram

Proof

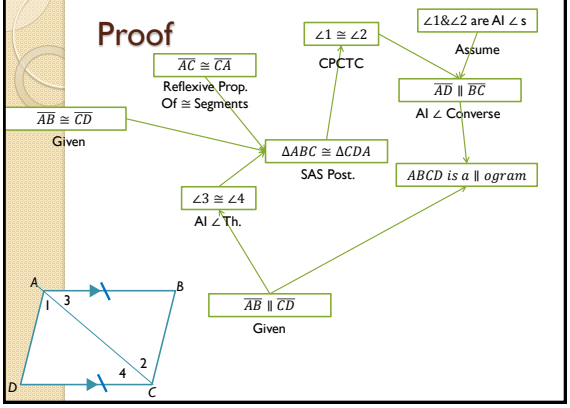


Are there any other tests we could do?

- What if we only had information about one pair of sides?
  - What would be the minimum needed to prove something about the other pair?



Proof



Ways to prove a quad. is a ∥ogram:

- If consecutive ∠s of a quad. are supp. ⇒ it is a ∥ogram.
- If the opp. ∠s of a quad. are ≅⇒ it is a ∥ogram.
- If the opp. sides of a quad. are ≅⇒ it is a ∥ogram.
- If the diag's of a quad. bisect each other ⇒ it is a ∥ogram.
- If one pair of opp. sides of a quad. are both ∥ and ≅ ⇒ it is a ∥ogram.