Common Core Geometry Proof – Parallelograms_1

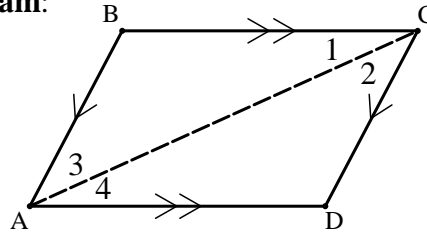## Opposite Sides

Theorem: If a quadrilateral is a parallelogram, then both pairs of opposite sides are congruent.

Given: ABCD is a parallelogram
      Diagonal $\overline{AC}$

Diagram:

Prove: $\overline{AB} \cong \overline{DC}$ and $\overline{BC} \cong \overline{AD}$

Statements	Reasons
1. Parallelogram ABCD	1. Given
2. $\overline{AB} \parallel \overline{DC}$ and $\overline{BC} \parallel \overline{AD}$	2. Definition of Parallelogram (i.e. A parallelogram is a quadrilateral with two pairs of parallel sides)
3. ∠1 and ∠4 are alternate interior angles; ∠2 and ∠3 are alternate interior angles	3. Definition of Alternate Interior Angles
4. ∠1 ≅ ∠4; ∠2 ≅ ∠3	4. Theorem: If two parallel lines are cut by a transversal, then the alternate interior angles formed are congruent.
5. $\overline{AC} \cong \overline{AC}$	5. Reflexive Axiom
6. △ABC ≅ △CDA	6. ASA ≅ ASA
7. $\overline{AB} \cong \overline{DC}$ and $\overline{BC} \cong \overline{AD}$	7. Corresponding Parts of Congruent Triangles are Congruent (CPCTC)