Geometry Practice: G.G.27 #2
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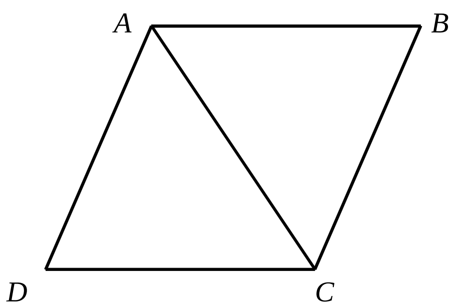
P.I. G.G.27: Write a proof arguing from a given hypothesis to a given conclusion

1. Given: *ABCD* is a rhombus.
   Prove: $\Delta BCA \cong \Delta DAC$



2. Given quadrilateral *ABCD* with $\angle BAC \cong \angle ACD$ and $\overline{AB} \cong \overline{CD}$. Write a paragraph proof, a flow proof, or a two-column proof to show *ABCD* is a parallelogram.

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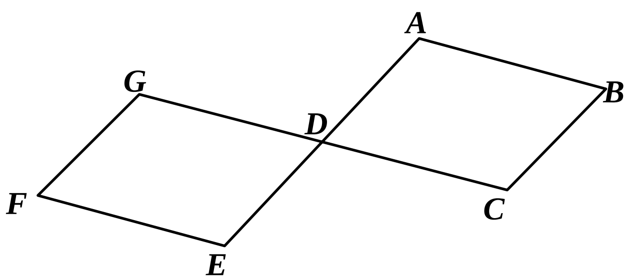
3. Theorem 9-6 states that if one pair of opposite sides of a quadrilateral is congruent and parallel, the quadrilateral is a parallelogram. This condition is met in two quadrilaterals. $\overline{AB}$ is parallel and congruent to $\overline{DC}$ in *ABCD*, $\overline{EF}$ is parallel and congruent to $\overline{HG}$ in *EFGH*, and $\overline{AB} \cong \overline{EF}$. Are the two quadrilaterals congruent?

4. Given that *ABCD* and *EFGD* are parallelograms and that *D* is the midpoint of $\overline{CG}$ and $\overline{AE}$, prove that *ABCD* and *EFGD* are congruent.



1. $ABCD$ is a rhombus	1. Given
2. $ABCD$ is a a parallelogram	2. Definition of a rhombus
3. $\Delta BCA \cong \Delta DAC$	3. The diagonals of a parallelogram form two congruent triangles.

[1]

[2] Check students' work. Show $\Delta ABC \cong \Delta CDA$ by SAS and that $ABCD$ is a parallelogram since both pairs of opposite sides of a quadrilateral are congruent.

[3] No, the other two sides are not necessarily congruent. Check students' examples.

[4] Check students' work. They should use the def. of midpoint and opposite sides of a parallelogram are $\cong$ to show that $\overline{AD} \cong \overline{DE} \cong \overline{FG} \cong \overline{BC}$ and $\overline{GD} \cong \overline{DC} \cong \overline{AB} \cong \overline{EF}$. Then, using the vert. $\angle$ thm. and opposite $\angle$'s of a parallelogram are $\cong$, show that $\angle GDE \cong \angle ADC \cong \angle B \cong \angle F$. $\angle G \cong \angle E \cong \angle C \cong \angle A$, since opposite angles are = and add to 360° in a parallelogram. Therefore $ABCD \cong EFGD$ because their corresponding sides and corresponding $\angle$'s $\cong$.