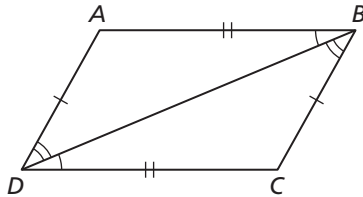## 5.2   Enrichment and Extension

Congruent Polygons

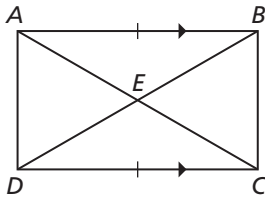**In Exercises 1 and 2, use the diagram to complete a two-column proof.**

1. **Given:** $\angle ABD \cong \angle CDB$, $\angle ADB \cong \angle CBD$, $\overline{AD} \cong \overline{BC}$, and $\overline{AB} \cong \overline{DC}$

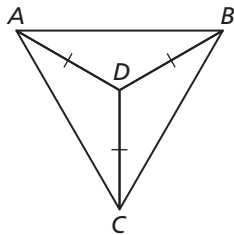   **Prove:** $\triangle ABD \cong \triangle CDB$

2. **Given:** $\overline{AB} \parallel \overline{DC}$, $\overline{AB} \cong \overline{DC}$, E is the midpoint of $\overline{AC}$ and $\overline{BD}$.

   Prove: $\triangle AEB \cong \triangle CED$

3. In the diagram below, $\triangle ADB \cong \triangle CDA \cong \triangle CDB$.

   a. Is $\triangle ABC$ equilateral? Explain your reasoning.

   b. The sum of the measures of $\angle ADB$, $\angle CDA$, and $\angle CDB$ is 360°. Find $m\angle BDC$.

   c. Find $m\angle DBC$ and $m\angle DCB$.

   d. Explain why the angle measures in part (c) are equal.

   e. Explain why $\triangle ABC$ is equiangular.