

5.2 Enrichment and Extension

1. STATEMENTS	REASONS
1. $\angle ABD \cong \angle CDB$	1. Given
2. $\angle ADB \cong \angle CBD$	2. Given
3. $\overline{AD} \cong \overline{BC}$	3. Given
4. $\overline{AB} \cong \overline{DC}$	4. Given
5. $\overline{BD} \cong \overline{BD}$	5. Reflexive Property of Congruence
6. $\angle BAD \cong \angle BCD$	6. Triangle Sum Theorem
7. $\triangle ABD \cong \triangle CDB$	7. All corresponding parts are congruent.

2. STATEMENTS	REASONS
1. $\overline{AB} \parallel \overline{DC}$	1. Given
2. $\overline{AB} \cong \overline{DC}$	2. Given
3. E is the midpoint of \overline{AC} and \overline{BD} .	3. Given
4. $\overline{AE} \cong \overline{EC}$	4. Definition of midpoint
5. $\overline{BE} \cong \overline{ED}$	5. Definition of midpoint
6. $\angle EAB \cong \angle ECD$	6. Alternate interior angles
7. $\angle ABD \cong \angle BDC$	7. Alternate interior angles
8. $\angle AEB \cong \angle CED$	8. Vertical Angles Theorem
9. $\triangle AEB \cong \triangle CED$	9. All corresponding parts are congruent

3. a. yes; You are given $\triangle ADB \cong \triangle CDA \cong \triangle CDB$.
So, $\overline{AB} \cong \overline{BC} \cong \overline{CA}$. Because all three sides of $\triangle ABC$ are congruent, it is an equilateral triangle.
- b. 120°
- c. $30^\circ, 30^\circ$
- d. The angle measures are equal because $\triangle CDB$ is isosceles.
- e. The measure of each of the congruent angles of each small triangle is 30° . By the Angle Addition Postulate (Post. 1.4), the measure of each angle of $\triangle ABC$ is 60° .