

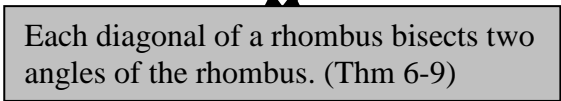
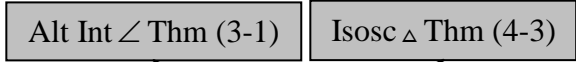
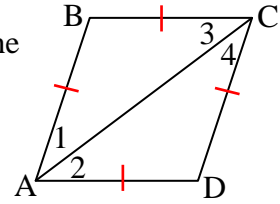
Use the concept maps provided for hints as you complete this sequence of proofs

Theorem 6.9

1. Conjecture: Each diagonal of a rhombus bisects two angles of the rhombus.

Given: rhombus $ABCD$

Prove: \overline{AC} bisects $\angle BAD$ & $\angle BCD$

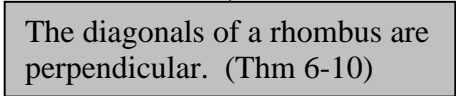
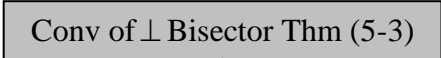
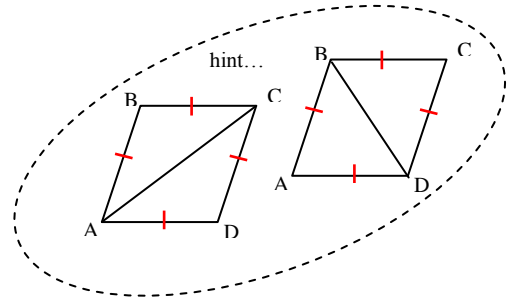
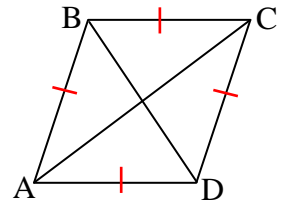


Theorem 6.10

2. Conjecture: The diagonals of a rhombus are perpendicular.

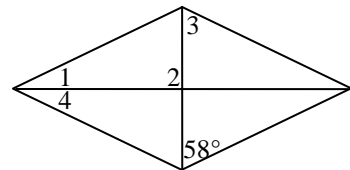
Given: rhombus $ABCD$

Prove: $\overline{AC} \perp \overline{BD}$



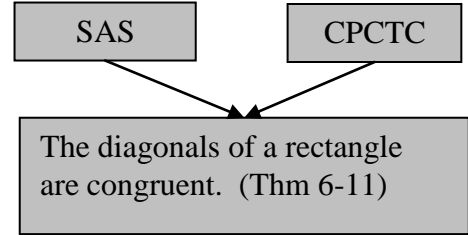
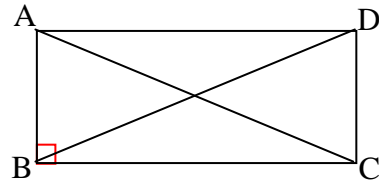
3. Application: pg 315, #5

Find the measures of the numbered angles in the rhombus.
(answer on HW answer sheet)



Theorem 6.11

4. Conjecture: The diagonals of a rectangle are congruent.
Given: Rectangle $ABCD$
Prove: $\overline{AC} \cong \overline{BD}$



5. Application: pg 315, #13

\overline{LMNP} is a rectangle. Find the value of x and the length of each diagonal.
(answer on HW answer sheet)

$$LN = 9x - 14 \text{ and } MP = 7x + 4$$

Theorems 6.12 – 6.14 are the converse statements of Theorems 6.9 – 6.11.
We can use these theorems to classify quadrilaterals.

Theorem 6-12 If one diagonal of a parallelogram bisects two angles of the parallelogram, then the parallelogram is a rhombus.

Theorem 6-13 If the diagonals of a parallelogram are perpendicular, then the parallelogram is a rhombus.

Theorem 6-14 The diagonals of a parallelogram are congruent, then the parallelogram is a rectangle.

6. Application: (not in the book) The diagonals of $ABCD$ are perpendicular. $AB = 16\text{cm}$ and $BC = 8\text{cm}$. Can $ABCD$ be a parallelogram? Explain.

(answer on the next page)

Answer for #6 prior page:

No; perpendicular diagonals in a parallelogram mean that the figure is a rhombus, but $ABCD$ is not a rhombus because its side lengths are not equal.

List of theorems from Lesson 6-4:

Theorem 6-9 Each diagonal of a rhombus bisects two angles of the rhombus.

Theorem 6-10 The diagonals of a rhombus are perpendicular.

Theorem 6-11 The diagonals of a rectangle are congruent.

Theorem 6-12 If one diagonal of a parallelogram bisects two angles of the parallelogram, then the parallelogram is a rhombus.

Theorem 6-13 If the diagonals of a parallelogram are perpendicular, then the parallelogram is a rhombus.

Theorem 6-14 The diagonals of a parallelogram are congruent, then the parallelogram is a rectangle.