Theorem 5-12

The diagonals of a rectangle are congruent.

Theorem 5-13

The diagonals of a rhombus are perpendicular.

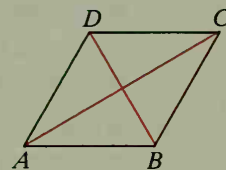## Theorem 5-14

Each diagonal of a rhombus bisects two angles of the rhombus.

Example Given: *ABCD* is a rhombus.
What can you conclude?

Solution *ABCD* is a parallelogram, with all the properties of
a parallelogram. Also:
By Theorem 5-13, $\overline{AC} \perp \overline{BD}$.
By Theorem 5-14, $\overline{AC}$ bisects $\angle DAB$ and $\angle BCD$;
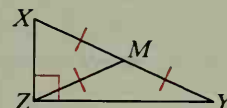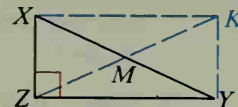$\overline{BD}$ bisects $\angle ABC$ and $\angle ADC$.

The properties of rectangles lead to the following interesting
conclusion about any right triangle.

Begin with rt. $\triangle XYZ$.
1. Draw lines to form rectangle *XZYK*. (How?)
2. Draw $\overline{ZK}$. $ZK = XY$ (Why?)
3. $\overline{ZK}$ and $\overline{XY}$ bisect each other. (Why?)
4. $MX = MY = MZ = MK$, by (2) and (3).
Since $MX = MY = MZ$, we have shown the following.

Theorem 5-15

The midpoint of the hypotenuse of a right triangle is equidistant from the
three vertices.

Proofs of the next two theorems will be discussed as Classroom Exercises.

Theorem 5-16

If an angle of a parallelogram is a right angle, then the parallelogram is a
rectangle.

Theorem 5-17

If two consecutive sides of a parallelogram are congruent, then the parallelogram
is a rhombus.