G2b Properties of Special Parallelograms

Objective: We will apply properties of special parallelograms.

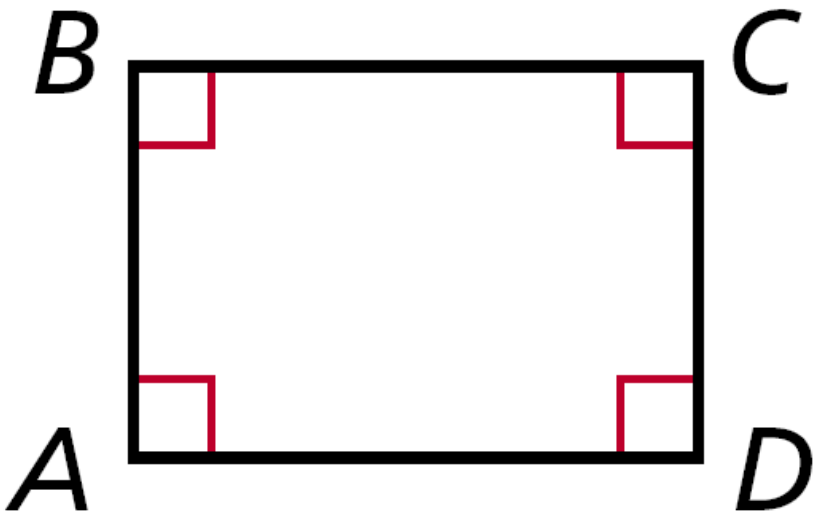
Homework: page 412-413: 1-6, 10-15, 23-31

G2b Properties of Special Parallelograms

March 30, 2017

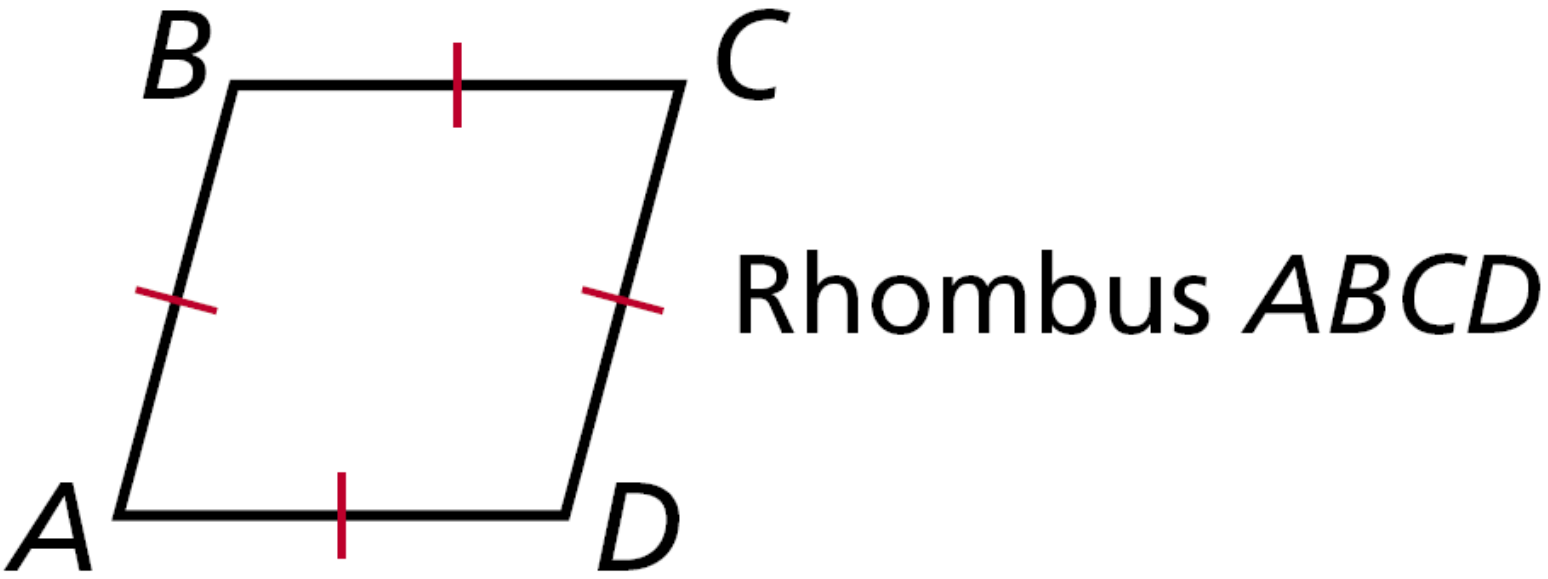
In your groups, decide what your own definition would be for a rhombus, square, and rectangle.

A **rectangle** is a parallelogram with four right angles.

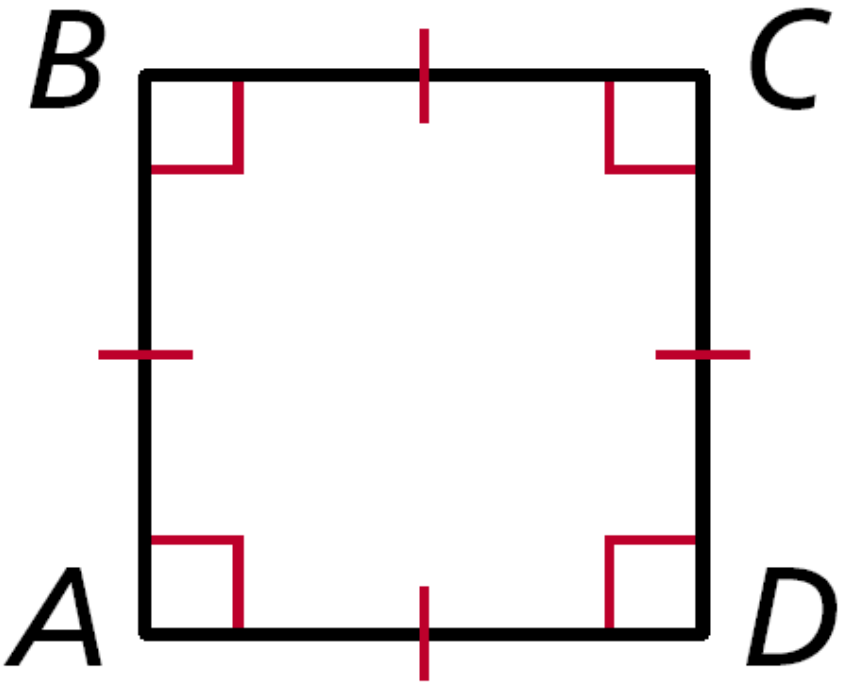


Rectangle *ABCD*

A **rhombus** is a parallelogram with four congruent sides.



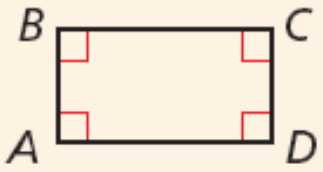
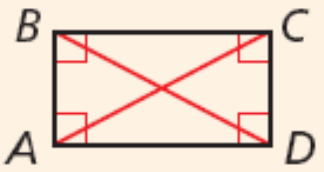
A **square** is a parallelogram with four congruent sides and four right angles.



Square *ABCD*

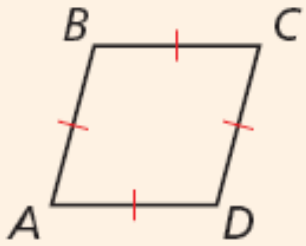
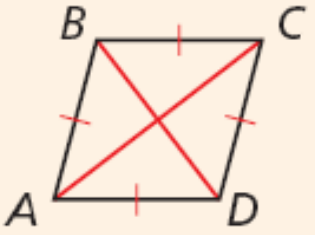
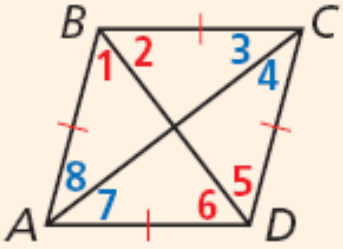
Complete the next three columns of *Properties of Parallelograms*

Theorems **Properties of Rectangles**

	THEOREM	HYPOTHESIS	CONCLUSION
6-4-1	If a quadrilateral is a rectangle, then it is a parallelogram. (rect. → ▱)		*ABCD* is a parallelogram.
6-4-2	If a parallelogram is a rectangle, then its diagonals are congruent. (rect. → diags. ≅)		$\overline{AC} \cong \overline{BD}$

Since a rectangle is a parallelogram by Theorem 6-4-1, a rectangle "inherits" all the properties of parallelograms that you learned in Lesson 6-2.

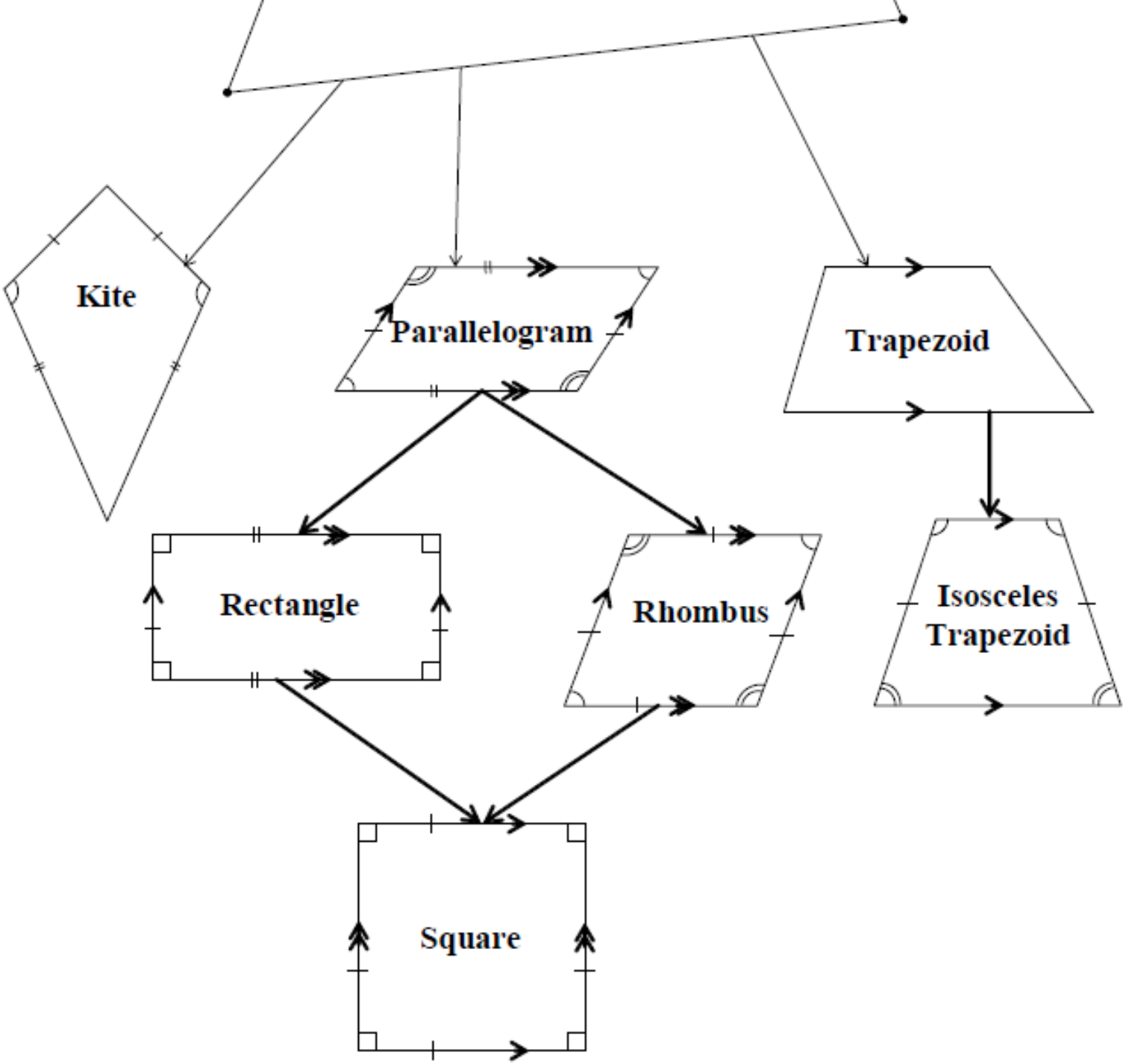
Theorems — Properties of Rhombuses

THEOREM	HYPOTHESIS	CONCLUSION
6-4-3 If a quadrilateral is a rhombus, then it is a parallelogram. (rhombus → ▱)		$ABCD$ is a parallelogram.
6-4-4 If a parallelogram is a rhombus, then its diagonals are perpendicular. (rhombus → diags. ⊥)		$\overline{AC} \perp \overline{BD}$
6-4-5 If a parallelogram is a rhombus, then each diagonal bisects a pair of opposite angles. (rhombus → each diag. bisects opp. ∠s)		$\angle 1 \cong \angle 2$ $\angle 3 \cong \angle 4$ $\angle 5 \cong \angle 6$ $\angle 7 \cong \angle 8$

Like a rectangle, a rhombus is a parallelogram. So you can apply the properties of parallelograms to rhombuses.

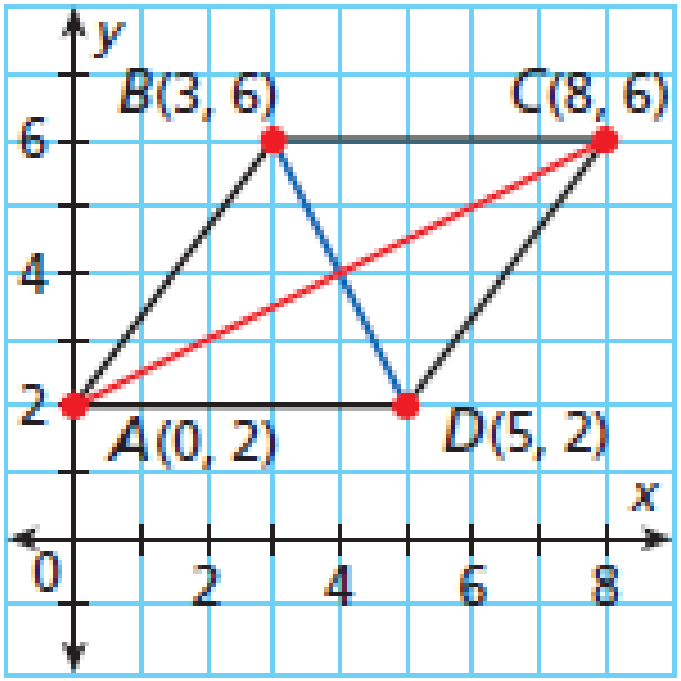
Quick Check-Always, Sometimes, Never

- Is a square a rhombus?
- Is a rhombus a square?
- Is a rectangle a square?
- Is a square a rectangle?


Kite
Parallelogram
Trapezoid
Rectangle
Rhombus
Isosceles
Trapezoid
Square

Use coordinate geometry to determine the most precise name for the quadrilateral with the given vertices.

$$A(0, 2), B(3, 6), C(8, 6), D(5, 2)$$



Use coordinate geometry to determine the most precise name for the quadrilateral with the given vertices.

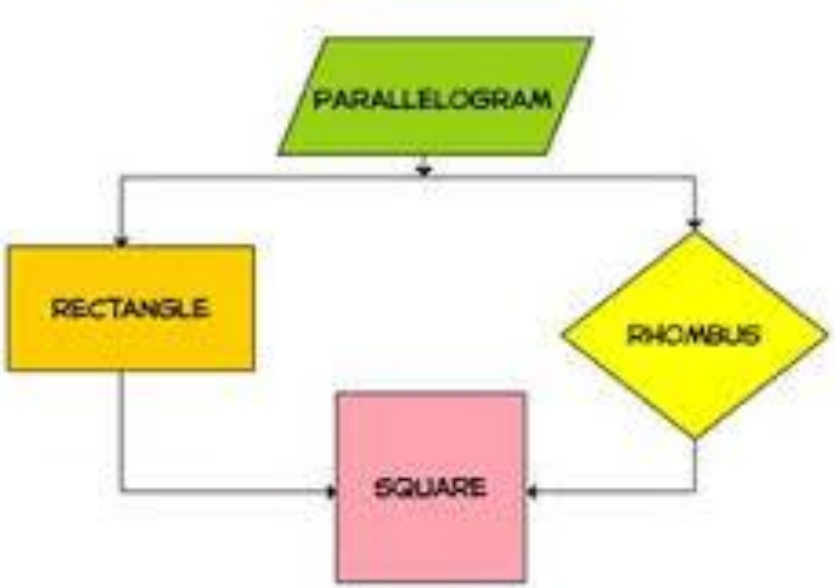
3a. $K(-5, -1), L(-2, 4), M(3, 1), N(0, -4)$

3b. $P(-4, 6), Q(2, 5), R(3, -1), S(-3, 0)$

$-4)$ rect., rhombus, square

) rhombus

Classwork: G2C properties of special parallelograms



SUMMARY

If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a

Parallelogram

If one angle of a parallelogram is a right angle, then the parallelogram is a

Rectangle

If one pair of adjacent sides of a parallelogram are congruent, then the quadrilateral is a

Rhombus

If two pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a

Parallelogram

If one pair of opposite sides of a quadrilateral are parallel and congruent, then the quadrilateral is a

Parallelogram

If the diagonals of a parallelogram bisect the angles of the parallelogram, then the quadrilateral is a Rhombus

If the diagonals of a parallelogram are congruent, then the parallelogram is a

Rectangle