

## Sec 6-4: Special Parallelograms

### Rhombus

If a quadrilateral is a Rhombus.

#### Theorem 6-9

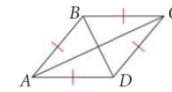
Each diagonal of a rhombus bisects two angles of the rhombus.

If a quadrilateral is a Rhombus.

#### Theorem 6-10

The diagonals of a rhombus are perpendicular.

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



Is PQRS a Parallelogram?

P(-4, 3) Q(-2, -3) R(10,1) S(8,7)

PR (3, 2) Yes, b/c diagonals  
QS (3, 2) bisect

P(-4, 3) Q(-2, -3) R(10,1) S(8,7)

Are the diagonals Perpendicular?

$$\begin{aligned} PR \quad m &= \frac{3-1}{-4-10} = \frac{2}{-14} = -\frac{1}{7} \\ QS \quad m &= \frac{7-3}{8-2} = \frac{4}{6} = \frac{2}{3} \end{aligned}$$

Is PQRS a Rhombus?

No diagonals not  $\perp$

- Draw a 12cm segment on a piece of paper and label the endpoints A and C.
- Place a dot at the midpoint.
- Draw another 12cm segment with the same midpoint as  $\overline{AC}$  but not perpendicular to  $\overline{AC}$ . Label the endpoints B and D
- Connect the four endpoints of these two diagonals.
- What is the best name for this figure?

Rectangle

P(-4, 3) Q(-2, -3) R(10,1) S(8,7)

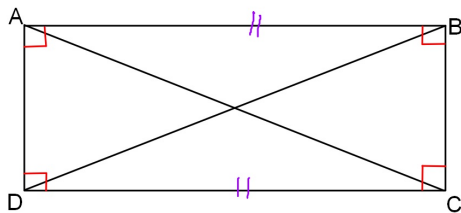
Find the length of the diagonals.

$$PR = \sqrt{200} \quad QS = \sqrt{200}$$

What is the best name for this Quadrilateral?

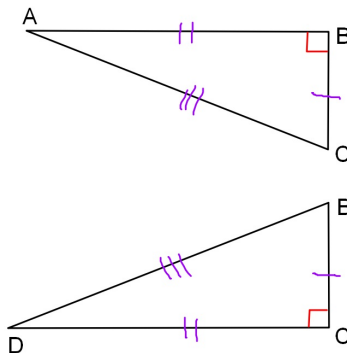
Rectangle

What is true about the diagonals of a rectangle?  $\cong$



Why is  $\triangle ABC \cong \triangle DCB$ ? SAS

Why is  $\overline{AC} \cong \overline{DB}$ ? CPCTC



If a Quadrilateral is a Rectangle.

**Theorem 6-11**

The diagonals of a rectangle are congruent.

## Is the Parallelogram a Rhombus or a Rectangle?

### 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

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

Ways to prove that a Quadrilateral is a Rhombus.

- Show it has four  $\cong$  sides (but not 4 right angles)
- Show that it's a Parallelogram with one diagonal bisecting two angles.
- Show that it's a Parallelogram whose diagonals are perpendicular (but not congruent)

Ways to prove that a Quadrilateral is a Rectangle.

- Show it has four right angles (but not 4  $\cong$  sides)
- Show that it's a Parallelogram with congruent diagonals (but not perpendicular)

If the diagonals of a quadrilateral are perpendicular and congruent, then the quadrilateral is a square.

Ways to prove that a Quadrilateral is a Square.

- Show it has four right angles and four  $\cong$  sides.
- Show that it's a Parallelogram with congruent and perpendicular diagonals.

Hwk #19

Sec 6-4

Pages 332-335

Problems 2, 4, 5, 6, 12, 16-18, 67-69

After each statement tell which of the figure(s) it is a characteristic of:

Parallelogram(P), Rhombus(Rh), Rectangle(Rec), Square(S)

1. All sides are congruent.

S, Rh

2. Opposite Sides are  $\cong$ .

P, Rh, R, S

3. Opposite sides are parallel.

R, S, P, Rh

4. Opposite Angles are  $\cong$ .

Re, S, P, Rh

5. All angles are Rt. angles.

Re, Sp

6. Consec angles are suppl

P, S, Rh, Re