

Geometry

Ch. 6 Handout 6.4

Special Parallelograms

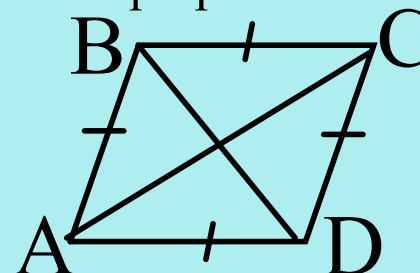
Quad Tree

(defn) Rhombus -- A quadrilateral with both pairs of opposite sides congruent

a) four congruent sides

(Theorem 6.10) The diagonals of a rhombus are perpendicular.

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

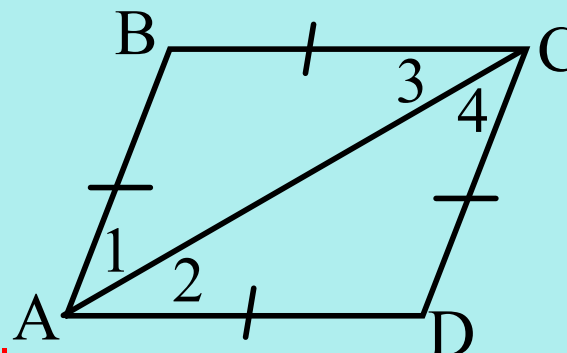


b) diagonals are perpendicular

(Theorem 6.9) Each diagonal of a rhombus bisects two angles of the rhombus

\overline{AC} bisects $\angle BAD$, so $\angle 1 \cong \angle 2$

\overline{AC} bisects $\angle BCD$, so $\angle 3 \cong \angle 4$



c) diagonals bisect opposite angles

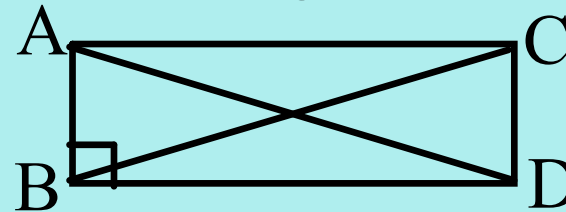
Quad Tree

(defn) Rectangle -- is a parallelogram with four right angles

a) four right angles

(Theorem 6.11) The diagonals of a rectangle are congruent.

$$\overline{AC} \cong \overline{BD}$$



b) diagonals are congruent

Quad Tree

(defn) Square -- a parallelogram with four congruent sides and four right angles

properties of rectangle { a) four right angles
b) diagonals are congruent

properties of rhombus { c) four congruent sides
d) diagonals are perpendicular
e) diagonals bisect opposite angles

Parallelograms

(Theorem 6.12) If one diagonal of a parallelogram bisects two angles of the parallelogram, then the parallelogram is a rhombus.

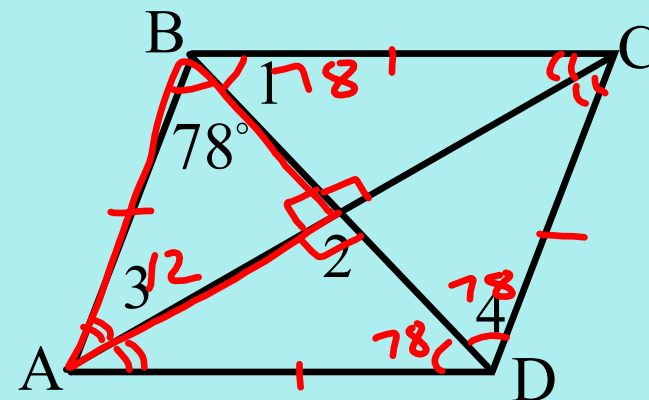
(Theorem 6.13) If the diagonals of a parallelogram are perpendicular, then the parallelogram is a rhombus.

(Theorem 6.14) If the diagonals of a parallelogram are congruent, then the parallelogram is a rectangle.

1. Find the measures of the numbered angles in the rhombus.

- a) four congruent sides
- b) diagonals perpendicular
- c) diagonals bisect opposite angles

Pull



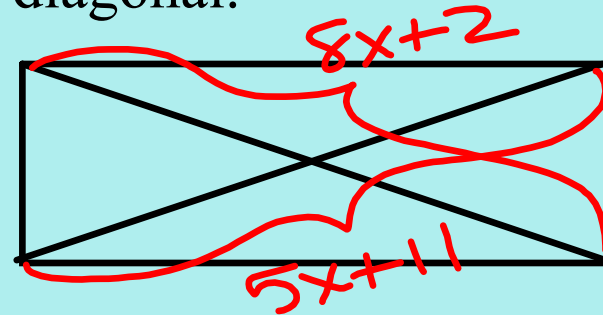
$$\begin{array}{r} 90 \\ - 78 \\ \hline 12 \end{array}$$

$$\begin{aligned} m\angle 1 &= 78 \\ m\angle 2 &= 90 \\ m\angle 3 &= 12 \end{aligned}$$

2. One diagonal of a rectangle has length $8x + 2$. The other diagonal has length $5x + 11$. Find the length of each diagonal.

- a) four right angles
- b) diagonals congruent

Pull



$$x = 3$$
$$\text{diagonals} = 26, 26$$

$$\begin{array}{r} 8x + 2 = 5x + 11 \\ -5x \quad -5x \end{array}$$

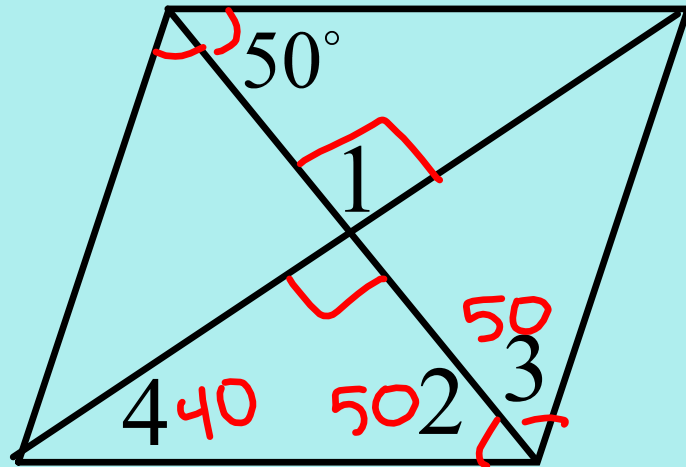
$$3x + 2 = 11$$

$$\begin{array}{r} -2 \quad -2 \end{array}$$

$$3x = 9$$

$$x = 3$$

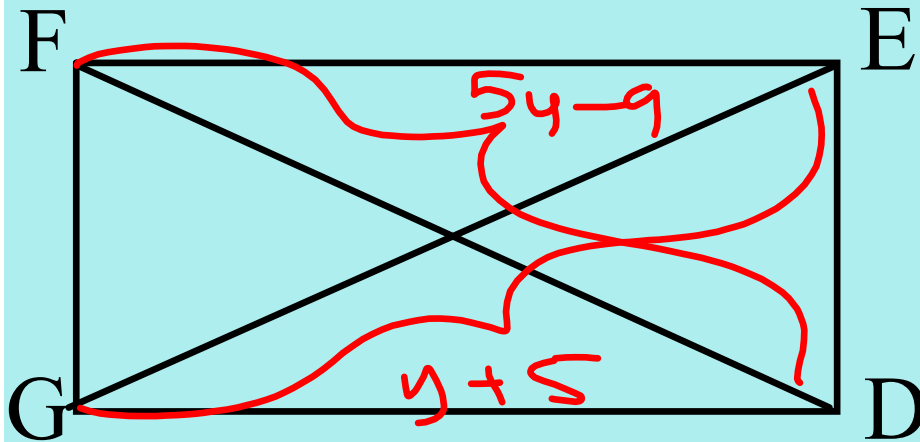
3. Find the measures of the numbered angles in the rhombus.



$$\begin{array}{r} 90 \\ - 50 \\ \hline 40 \end{array}$$

$$\begin{aligned} m\angle 1 &= 90 \\ m\angle 2 &= 50 \\ m\angle 3 &= 50 \\ m\angle 4 &= 40 \end{aligned}$$

5. Find the length of the diagonals of rectangle GFED if $FD = 5y - 9$ and $GE = y + 5$.



diagonals \cong

$$\begin{array}{r} 5y - 9 = y + 5 \\ -y \quad -y \\ \hline 4y = 14 \\ \frac{4y}{4} = \frac{14}{4} \\ y = \frac{7}{2} \end{array}$$

6. A parallelogram has angles 30° , 150° , 30° , and 150° . Can you conclude that it is a rhombus or a rectangle? Explain.



Pull

No, there is not enough information to conclude that the parallelogram is a rhombus. It cannot be a rectangle because it doesn't have right angles.

Assignment:

Day 1: 6.4 pgs 332-335 (1-15, 44-46, 50-53)

