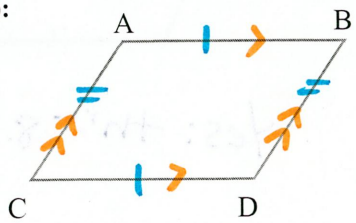
Chapter 8.3: Use Properties of Parallelograms

Parallelogram with Congruent Sides Converse Theorem (Theorem 8.7):
(Converse of Theorem 8.3)

If both pairs of opposite sides of a quadrilateral are Congruent,

then the quadrilateral is a parallelogram.

If $\overline{AC} \cong \overline{BD}$ AND $\overline{AB} \cong \overline{CD}$ then ABCD is a parallelogram.

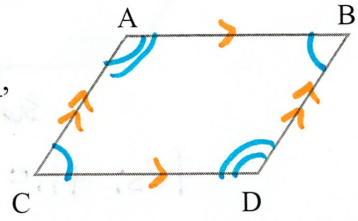


Parallelogram with Congruent Angles Converse Theorem (Theorem 8.8):
(Converse of Theorem 8.4)

If both pairs of opposite angles of a quadrilateral are Congruent,

then the quadrilateral is a parallelogram.

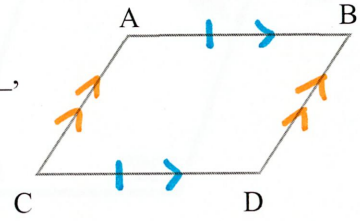
If $\angle A \cong \angle D$ AND $\angle B \cong \angle C$ then ABCD is a parallelogram.



Quadrilateral with a Congruent and Parallel Side (Theorem 8.9):

If one pair of opposite sides of a quadrilateral are Congruent, and parallel, then the quadrilateral is a parallelogram.

If $\overline{AB} \cong \overline{CD}$ AND $\overline{AB} \parallel \overline{CD}$ then ABCD is a parallelogram.

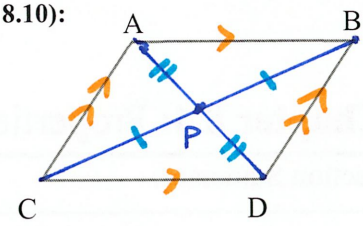


Parallelogram with Bisecting Diagonal Converse Theorem (Theorem 8.10):
(Converse of Theorem 8.6)

If the diagonals of a quadrilateral bisect each other, then

the quadrilateral is a parallelogram

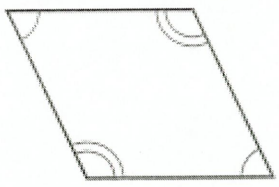
If $\overline{AP} \cong \overline{DP}$ AND $\overline{CP} \cong \overline{BP}$ then ABCD is a parallelogram.



Example #1: Decide whether you are given enough information to determine that the quadrilateral is a parallelogram. Explain your reasoning.

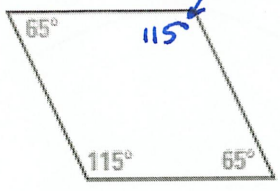
360-65-115-65

a.)



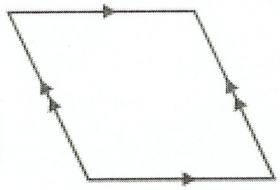
Yes: thm 8.8

b.)

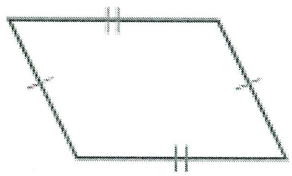


Yes: thm 8.8

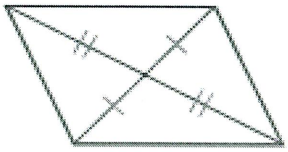
c.)



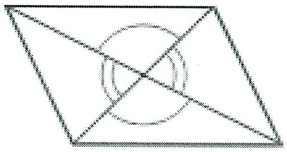
Yes: Defn of parallelogram.

d.) 

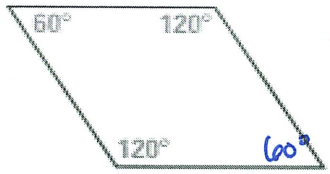
Yes: thm 8.7

e.) 

Yes: th 8.10

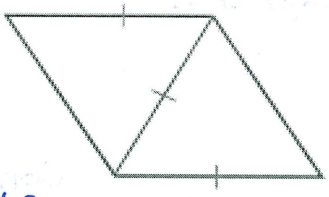
f.) 

Not Enough Info

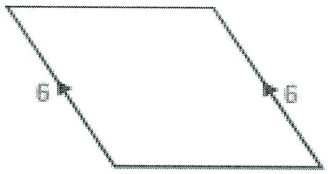
g.) 

360 - 120 - 120 - 60

Yes; th 8.8

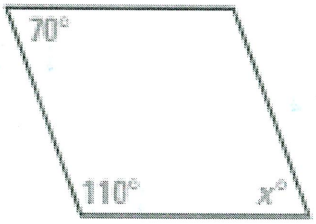
h.) 

Not Enough Info

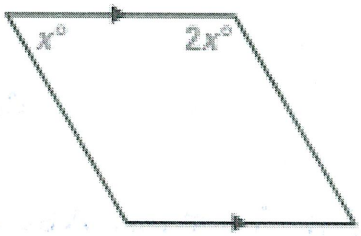
i.) 

Yes; thm 8.9

Example #2: What value of x will make the polygon a parallelogram?

a.) 

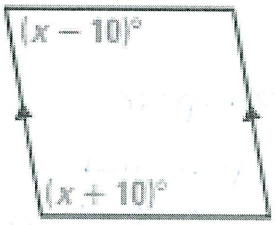
$X = 70°$

b.) 

$X + 2x = 180$

$\frac{3x}{3} = \frac{180}{3}$

$X = 60°$

c.) 

$X - 10 + X + 10 = 180$

$\frac{2x}{2} = \frac{180}{2}$

$X = 90°$

Chapter 8.4: Properties of Rhombuses, Rectangles and Squares

Section Summary: