

## Bellwork

### 01/25/2012

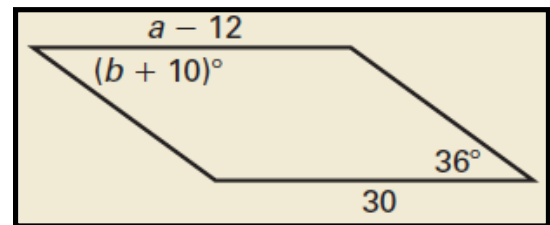
1. Find the values of  $a$  and  $b$  in the parallelogram.

$$a - 12 = 30$$

$$\boxed{a = 42}$$

$$b + 10 = 36$$

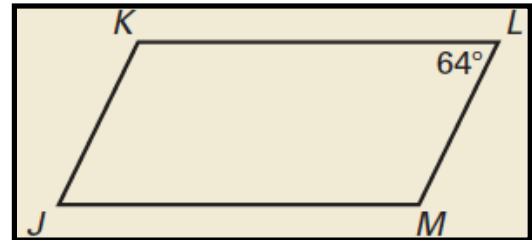
$$\boxed{b = 26}$$



2. Find the measure of  $\angle K$  in the parallelogram.

$$m\angle K + 64 = 180$$

$$\boxed{m\angle K = 116^\circ}$$



**Geometry**  
**8.3 Show that a Quadrilateral is a Parallelogram**  
**Standard(s): 6, 8**

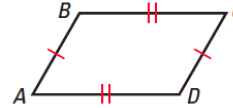
**Vocabulary:**

**THEOREMS**

*For Your Notebook*

**THEOREM 8.7**

If both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram.

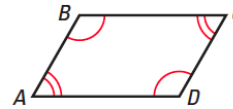


If  $\overline{AB} \cong \overline{CD}$  and  $\overline{BC} \cong \overline{AD}$ , then  $ABCD$  is a parallelogram.

*Proof:* below

**THEOREM 8.8**

If both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram.



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

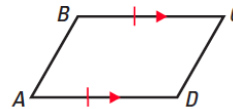
*Proof:* Ex. 38, p. 529

**THEOREMS**

*For Your Notebook*

**THEOREM 8.9**

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

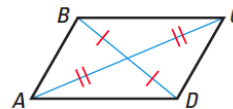


If  $\overline{BC} \parallel \overline{AD}$  and  $\overline{BC} \cong \overline{AD}$ , then  $ABCD$  is a parallelogram.

*Proof:* Ex. 33, p. 528

**THEOREM 8.10**

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



If  $\overline{BD}$  and  $\overline{AC}$  bisect each other, then  $ABCD$  is a parallelogram.

*Proof:* Ex. 39, p. 529

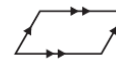
**CONCEPT SUMMARY**

*For Your Notebook*

**Ways to Prove a Quadrilateral is a Parallelogram**

1. Show both pairs of opposite sides are parallel.

*(DEFINITION)*



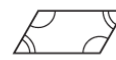
2. Show both pairs of opposite sides are congruent.

*(THEOREM 8.7)*



3. Show both pairs of opposite angles are congruent.

*(THEOREM 8.8)*



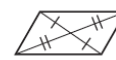
4. Show one pair of opposite sides are congruent and parallel.

*(THEOREM 8.9)*



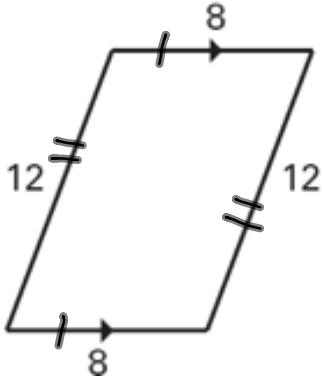
5. Show the diagonals bisect each other.

*(THEOREM 8.10)*



## Use Theorem to Prove a Parallelogram

What theorem can you use to show that the quadrilateral is a parallelogram.



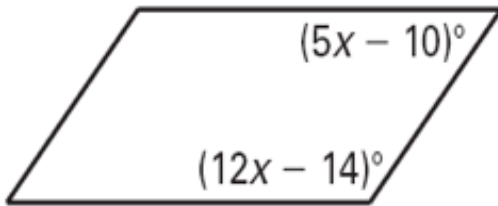
Thm. 8.7  
or Thm. 8.9



Thm. 8.8

## Use Algebra to Prove a Parallelogram

For what value of  $x$  is the quadrilateral a parallelogram?

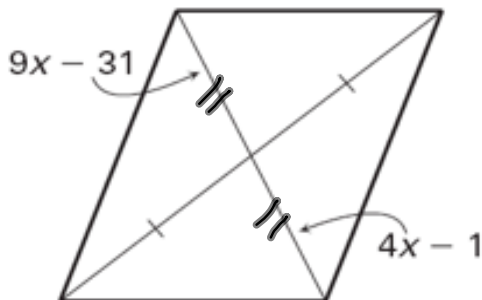


$$(5x - 10) + (12x - 14) = 180$$

$$17x - 24 = 180$$

$$17x = 204$$

$$x = 12$$



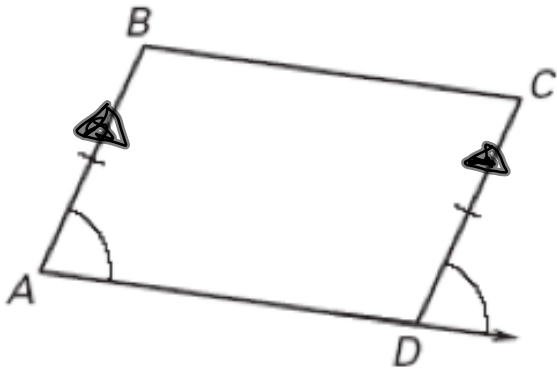
$$9x - 31 = 4x - 1$$

$$5x = 30$$

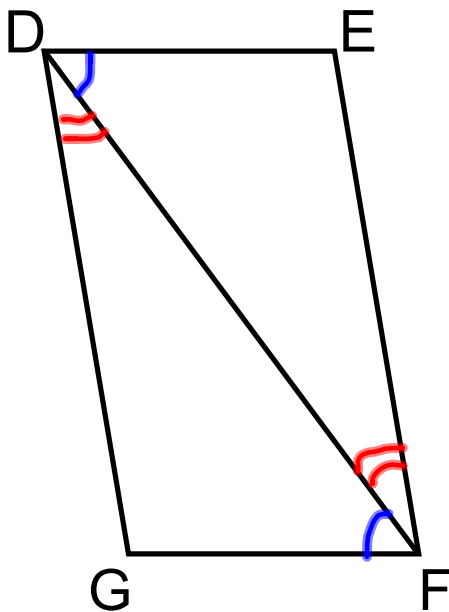
$$x = 6$$

## Proving a Parallelogram

Describe how to prove that DEFG is a parallelogram.



1.  $\overline{AB} \parallel \overline{DC}$  by Corresponding  $\angle$ 's Converse
2. ABCD is a by Thm 8.9



- 1.
- 2.
- 3.
- 4.

1.  $\overline{DE} \parallel \overline{GF}$  by Alt. Int  $\angle$ 's converse  
 $\overline{DG} \parallel \overline{EF}$  " " " " "
2. DEFG is a by def. of a

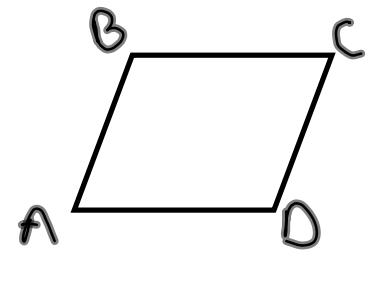
## Use Coordinate Geometry

Three of the vertices of parallelogram ABCD are given. Find the coordinates of point D. Show your method.

**A(-1,0), B(0,-4), C(8,-6), D(x,y)**

$-1 + 4$

$(7, -2)$



## **Homework Assignment**

### **Worksheet 8.3B**

