6.2 Parallelograms

Don't forget to put it in the table of contents.

After this lesson, you should be able to successfully recognize and apply the properties of parallelograms.
Parallelogram
A quadrilateral in which both pairs of opposite sides are parallel

Parallelogram
A quadrilateral in which both pairs of opposite sides are parallel

Both pairs
Opposite sides are congruent.

Both pairs
Opposite angles are congruent.

Consecutive angles are supplementary.

Diagonals bisect each other.

If a parallelogram has 1 rt $\angle$, then it has 4 rt angles.

If a parallelogram has 1 $\angle \cong$, then it has 2 $\angle \cong$.

Find the values of each variable.

1. $3y = 112$
2. $5x - 6 = 12$
3. $55^\circ$
4. $3x^\circ$
5. $95^\circ$
6. $2y^\circ$

Cut this piece off.
Opposite sides are congruent.

Opposite angles are congruent.

If a parallelogram has 1 rt \( \angle \), then it has 4 rt angles.

Find the value of each variable.

1. \( 30x = 150 \)  
   \( 30x = 150 \)  
   \( x = 5 \)  
   \( y = \frac{y}{2} \)  
   \( y = 180 \)

2. \( 8x = 112 \)  
   \( 8x = 112 \)  
   \( x = 14 \)

3. \( 3x = 90 \)  
   \( 3x = 90 \)  
   \( x = 30 \)  
   \( y = 22.5 \)

Consecutive angles are supplementary.

Diagonals bisect each other.

Each diagonal separates the parallelogram into 2 \( \triangle \)'s.

If each quadrilateral is a parallelogram, find the value of each variable.

1. \( 8y \)
2. \( 36 \)
3. \( 6 \)
4. \( 6 \)
5. \( x = \frac{y}{2} \)
6. \( y = \frac{y}{2} \)

Explain why it is impossible for each figure to be a parallelogram.

1. \( \angle \)
2. \( \angle \)
3. \( \angle \)
4. \( \angle \)
5. \( \angle \)
6. \( \angle \)

If each quadrilateral is a parallelogram, find the value of each variable.

1. \( 8y \)
2. \( 36 \)
3. \( 6 \)
4. \( 6 \)
5. \( x = \frac{y}{2} \)
6. \( y = \frac{y}{2} \)

Explain why it is impossible for each figure to be a parallelogram.

1. \( \angle \)
2. \( \angle \)
3. \( \angle \)
4. \( \angle \)
5. \( \angle \)
6. \( \angle \)
If each quadrilateral is a parallelogram, find the value of each variable.

1. \[8y = 6x\]
   \[\frac{8y}{6} = \frac{6x}{6}\]
   \[y = x\]

2. \[2y = 2x\]
   \[\frac{2y}{2} = \frac{2x}{2}\]
   \[y = x\]

3. \[6x = 90\]
   \[x = 15\]
   \[y = 11\]

4. \[2y = 12\]
   \[y = 6\]

5. \[x = 73\]
   \[z = 105\]
   \[y = 73\]

6. \[x = 31\]
   \[y = 44\]
   \[z = 105\]
On the Worksheet
6.2 parallelograms 2016 ink.notebook

January 11, 2017

Coordinate Geometry. Find the coordinates of the intersection of the diagonal of \(\square ABCD\) with the given vertices.

A. \(A(3, 6), B(5, 8), C(3, -2),\) and \(D(1, -4)\)

B. \(A(-4, 3), B(2, 3), C(-1, -2),\) and \(D(-7, -2)\)

HOMEWORK

Practice WS on Parallelograms

Find the value of each variable.

1. \(2a - 5, 3a - 5\)
2. \(2b + 1, 3b + 3\)
Find the value of each variable.

3. \[ \begin{array}{c}
G & 28 \\
D & \text{x - 2} \\
E & \text{x + 1}
\end{array} \]

4. \[ \begin{array}{c}
D & \text{y + 8} \\
A & \text{y + 8} \\
B & \text{2y + 6}
\end{array} \]

Find the value of each variable.

5. \[ \begin{array}{c}
W & \text{a + 4} \\
Z & \text{b + 4}
\end{array} \]

6. \[ \begin{array}{c}
O & \text{a + 5} \\
P & \text{b + 5}
\end{array} \]

Use \( \square RSTU \) to find each measure or value.

7. \( m \angle RST = \) ____

8. \( m \angle STU = \) ____

9. \( m \angle TUR = \) ____

10. \( b = \) ____

Coordinate Geometry. Find the coordinates of the intersection of the diagonal of \( \square HJKL \) with the given vertices.

11. \( H(1, 1), J(2, 3), K(6, 3), L(5, 1) \)
12. \( H(-1, 4), J(3, 3), K(3, -2), L(-1, -1) \)

13. **CONSTRUCTION** Mr. Rodriguez used the parallelogram at the right to design a herringbone pattern for a paving stone. He will use the paving stone for a sidewalk. If \( m \angle 1 \) is 130, find \( m \angle 2, m \angle 3, \) and \( m \angle 4. \)

14. **DISTANCE** Four friends live at the four corners of a block shaped like a parallelogram. Gracie lives 3 miles away from Kenny. How far apart do Teresa and Travis live from each other?

15. Find the value of each variable.

16. Find the value of each variable.
Find the value of each variable.

17. \( x + 3 = 15 \), \( x = 12 \)

18. \( y + 1 = 26 \), \( y = 25 \)

Answers:

1. \( 2a = 3a - 5 \), \( a = 5 \), \( 2b - 1 = b + 3 \), \( b = 4 \)
2. \( x - 2 = 19 \), \( x = 21 \), \( y + 1 = 26 \), \( y = 25 \)
3. \( a + 14 = 6a + 4 \), \( a = 2 \), \( 9b + 8 = 10b + 1 \), \( b = 7 \)
4. \( 125 \) 9. \( 125 \) 11. \( (3.5, 2) \)
5. \( m\angle 2 = 50 \), \( m\angle 3 = 130 \), \( m\angle 4 = 50 \)
6. \( 3a - 4 = a + 2 \), \( a = 3 \), \( b + 1 = 2b \), \( b = 1 \)
7. \( x - 3 = 15 \), \( x = 18 \), \( y + 3 = 12 \), \( y = 9 \)

In the book, do pages 403 – 407, problems:

9 – 12, 15 – 20, 46, 47
6.2 parallelograms 2016 ink.notebook

January 11, 2017

**ALGEBRA** Find the value of each variable in each parallelogram.

15. \[ \begin{array}{c}
X & 3a + 7 \\
Y & 101^\circ \\
W & 2b \\
Z & 4a + b + 11 \\
\end{array} \]

16. \[ \begin{array}{c}
Q & x + 5 \\
P & 101^\circ \\
R & y \\
S & y + 7 \\
\end{array} \]

**ALGEBRA** Find the value of each variable in each parallelogram.

17. \[ \begin{array}{c}
A & 10 \\
B & 11 \\
C & y = 7 \\
D & x + 6 \\
\end{array} \]

18. \[ \begin{array}{c}
T & a + 15 \\
S & b + 11 \\
R & 3b - 17 \\
V & 3a + 11 \\
\end{array} \]

**ALGEBRA** Find the value of each variable in each parallelogram.

19. \[ \begin{array}{c}
F & 2x + 7 \\
G & |x - 5| \\
H & (2x + 11)^\circ \\
D & 2x^\circ \\
\end{array} \]

20. \[ \begin{array}{c}
J & 2x + 7 \\
K & 3y - 5 \\
L & x + 9 \\
M & y + 5 \\
\end{array} \]

46. Two consecutive angles of a parallelogram measure \(3x + 42\) and \(9x - 18\). What are the measures of the angles?

\[ \begin{array}{c}
A & 13, 167 \\
B & 58.5, 31.5 \\
C & 39, 141 \\
D & 81, 99 \\
\end{array} \]
47. **GRIDDED RESPONSE** Parallelogram $MNPQ$ is shown. What is the value of $x$?

![Diagram of parallelogram MNPQ with angles labeled as $6x^\circ$ and $(7x + 11)^\circ$.]