Date 12/2

6.2 Properties of Parallelograms

Learning Targets: The student will learn
• the relationships among sides and among angles of parallelograms
• to use relationships involving diagonals of parallelograms or transversals

A. Theorem 6.4
If three (or more) parallel lines cut off congruent segments on one transversal, then they cut off congruent segments on every transversal.

B. Parallelograms
Definition: A parallelogram is a quadrilateral in which both pairs of opposite sides are parallel.

Let's take an old skill and make some connections...

Given: AB || CD and AC || BD
Prove: ΔABC ≅ ΔDCB

Find the values of x and y.

\[
\begin{align*}
2x &= x + 8 \\
2x &= 3y \\
2x &= 2y + 5
\end{align*}
\]

\[
\begin{align*}
x + 8 &= 2y + 5 \\
x &= 2y - 3
\end{align*}
\]

\[
\begin{align*}
2y - 3 &= 3y \\
2y &= 3y - 3
\end{align*}
\]

\[
\begin{align*}
x &= 6 \\
y &= 9
\end{align*}
\]
C. Additional Properties of Parallelograms

*If the quadrilateral is a parallelogram, then...*

(\textit{by CPCTC}) Opposite sides are congruent (Th 6.1)

(by CPCTC) Opposite angles are congruent (Th 6.2)

The diagonals bisect each other (Th 6.3)

Consecutive Angles are supplementary.

The following shape is a parallelogram. Find the values of \(a\) and \(b\).

\[
\begin{align*}
2a - 8 & = b + 10 \\
2b + 4 & = b + 10
\end{align*}
\]

\[
\begin{align*}
b + 10 & = 2(b + 2) - 8 \\
b + 10 & = 2b + 4 - 8
\end{align*}
\]

\[
\begin{align*}
b + 10 & = 2b - 4 \\
b & = 14 \\
a & = 10
\end{align*}
\]

Homework

Pg. 315 #5-39 (odd), 45, 47

5 Relationships

- Opp sides \(\parallel\)
- Opp sides \(\cong\)
- Opp \(\angle\)s \(\cong\)
- Diagonals bisect each other
- Consecutive \(\angle\)s are supp