Objective 1  Use Relationships Among Sides and Angles of Parallelograms

A(n) __________ is a quadrilateral with both pairs of opposite sides parallel.

In a parallelogram and in all other quadrilaterals, opposite sides do not share a ______ and opposite angles do not share a ______.

The “☐” notation means “parallelogram”.

Opposite Sides of a Parallelogram Theorem

<table>
<thead>
<tr>
<th>Theorem</th>
<th>If...</th>
<th>Then...</th>
</tr>
</thead>
<tbody>
<tr>
<td>If a quadrilateral is a parallelogram, then its opposite sides are congruent.</td>
<td>$ABCD$ is a $☐$</td>
<td>$AB \cong CD$ and $BC \cong DA$</td>
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### Opposite Angles of a Parallelogram Theorem

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<td>If a quadrilateral is a parallelogram, then its opposite angles are congruent.</td>
<td>$ABCD$ is a $\square$</td>
<td>$\angle A \cong \angle C$ and $\angle B \cong \angle D$</td>
</tr>
</tbody>
</table>

### Work Video Exercises 1 & 2 with me.

Multiple Choice. Use $\square MNQP$ to find the indicated value.

1. $m\angle M =$
   - a. $138^\circ$
   - b. $42^\circ$
   - c. $222^\circ$
   - d. $48^\circ$

2. $NQ =$
   - a. $6.5\text{ cm}$
   - b. $1.5\text{ cm}$
   - c. $4\text{ cm}$
   - d. $2.5\text{ cm}$
Objective 2

Use Relationships Among Consecutive Angles and Diagonals of Parallelograms

Angles of a polygon that share a side are consecutive angles. \( \angle A \) and \( \angle D \) are consecutive angles. \( \angle D \) and \( \angle C \) are consecutive angles. \( \angle C \) and \( \angle B \) are consecutive angles. \( \angle B \) and \( \angle A \) are consecutive angles.

Consecutive Angles of a Parallelogram Theorem

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</table>
| If a quadrilateral is a parallelogram, then its consecutive angles are supplementary. | \( ABCD \) is a \( \square \) | \( m\angle A + m\angle B = 180^\circ \) 
\( m\angle B + m\angle C = 180^\circ \) 
\( m\angle C + m\angle D = 180^\circ \) 
\( m\angle D + m\angle A = 180^\circ \) |
Section 6.2 Parallelograms

### Diagonals of a Parallelogram Theorem

<table>
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</tr>
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<tbody>
<tr>
<td>If a quadrilateral is a parallelogram, then its diagonals bisect each other.</td>
<td>$ABCD$ is a $\square$</td>
<td>$AE \cong CE$ and $BE \cong DE$</td>
</tr>
</tbody>
</table>

Any two consecutive angles of a parallelogram have a sum of _____. (supplementary)

**Work Video Exercise 4 with me.**

4. Find the value of $x$ in the parallelogram.

```
\[ \begin{array}{c}
\text{ } \\
53^\circ \\
\text{ } \\
\text{ } \\
x^\circ
\end{array} \]
```

**Pause and work Video Exercise 5.**

Find the value of the variable in the parallelogram.

5. 

```
\[ \begin{array}{c}
\text{ } \\
(6x + 14)^\circ \\
\text{ } \\
(2x + 30)^\circ
\end{array} \]
```

**Play and check.**
Work Video Exercises 6 & 7 with me.

Find the indicated measure in $\square ABDC$.

6. $AD$

7. $CD$

Multiple Parallel Lines and Transversals Theorem

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</tr>
</thead>
<tbody>
<tr>
<td>If three (or more) parallel lines cut off congruent segments on one transversal, then they cut off congruent segments on every transversal.</td>
<td>$\overline{AB} \parallel \overline{CD} \parallel \overline{EF}$ and $\overline{AC} \cong \overline{CE}$</td>
<td>$\overline{BD} \cong \overline{DF}$</td>
</tr>
</tbody>
</table>
Work Video Exercise 8 & 9 with me.

In the figure, \( PQ = QR = RS \). Find the indicated length.

8. \( ZU \)

9. \( TU \)