



Name _____ Date _____

Parallel Lines (Pages 188–192)

Parallel lines are lines in a plane that will never intersect. If line p is parallel to line q , then write $p \parallel q$. A line that intersects two or more other lines is called a **transversal**. Congruent angles formed by parallel lines and a transversal have special names. Angles formed by parallel lines and a transversal also have certain special relationships.

<p>Congruent Angles With Parallel Lines</p>	<p>If a pair of parallel lines is intersected by a transversal, these pairs of angles are congruent.</p> <p>alternate interior angles: $\angle 4 \cong \angle 6$, $\angle 3 \cong \angle 5$</p> <p>alternate exterior angles: $\angle 1 \cong \angle 7$, $\angle 2 \cong \angle 8$</p> <p>corresponding angles: $\angle 1 \cong \angle 5$, $\angle 2 \cong \angle 6$, $\angle 3 \cong \angle 7$, $\angle 4 \cong \angle 8$</p>	
<p>Vertical Angles and Supplementary Angles</p>	<p>Vertical angles are opposite angles formed by the intersection of two lines. Vertical angles are congruent. (For example, $\angle 1 \cong \angle 3$ above.)</p> <p>Supplementary angles are two angles whose measures have a sum of 180°. (For example, $\angle 1$ is supplementary to $\angle 2$ above.)</p>	

EXAMPLES

Use the figure above for these examples.

A Find $m\angle 1$ if $m\angle 5 = 60^\circ$.

$\angle 1$ and $\angle 5$ are corresponding angles.
Corresponding angles are congruent.
Since $m\angle 5 = 60^\circ$, $m\angle 1 = 60^\circ$.

B Find $m\angle 6$ if $m\angle 7 = 75^\circ$.

$\angle 6$ and $\angle 7$ are supplementary angles.
So, $m\angle 6 + m\angle 7 = 180^\circ$.
 $m\angle 6 + 75^\circ = 180^\circ$ *Substitute 75° for $m\angle 7$.*
 $m\angle 6 = 105^\circ$ *Subtract 75° from each side.*

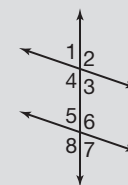
Try These Together

Use the figure at the right for Exercises 1–4. The two lines are parallel.

1. Find $m\angle 2$ if $m\angle 8 = 110^\circ$.

HINT: Identify the type of angles first.

2. Find $m\angle 4$ if $m\angle 6 = 122^\circ$.



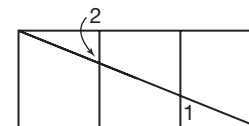
PRACTICE

3. Find $m\angle 3$ if $m\angle 2 = 98^\circ$.

4. Find $m\angle 7$ if $m\angle 3 = 45^\circ$.

5. $\angle p$ and $\angle q$ are congruent. Solve for x if $m\angle p = (2x - 5)^\circ$ and $m\angle q = 75^\circ$.

6. **Hobbies** Alexis is making a quilt with a pattern that uses parallel lines and transversals. The pattern is shown at the right. If $m\angle 1$ is 68° , what should $m\angle 2$ be?



7. **Standardized Test Practice** $\angle a$ and $\angle b$ are alternate exterior angles of parallel lines. If $m\angle a$ is 138° , what is $m\angle b$?

A 180°

B 138°

C 42°

D 48°

Answers: 1. 110° 2. 122° 3. 82° 4. 45° 5. 40 6. 68° 7. B