Study Guide

Angles and Parallel Lines

If two parallel lines are cut by a transversal, then the following pairs of angles are congruent.

corresponding angles   alternate interior angles   alternate exterior angles

If two parallel lines are cut by a transversal, then consecutive interior angles are supplementary.

Example: In the figure $m \parallel n$ and p is a transversal. If $m\angle 2 = 35$, find the measures of the remaining angles.
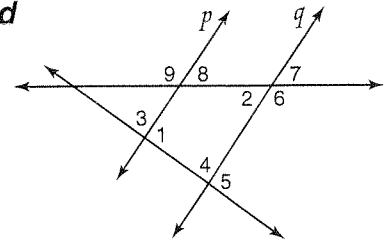

Since $m\angle 2 = 35$, $m\angle 8 = 35$ (corresponding angles).
Since $m\angle 2 = 35$, $m\angle 6 = 35$ (alternate interior angles).
Since $m\angle 8 = 35$, $m\angle 4 = 35$ (alternate exterior angles).

$m\angle 2 + m\angle 5 = 180$. Since consecutive interior angles are supplementary, $m\angle 5 = 145$, which implies that $m\angle 3$, $m\angle 7$, and $m\angle 1$ equal 145.
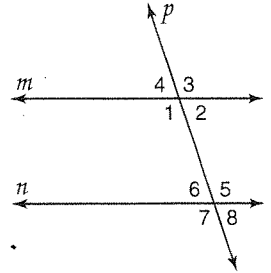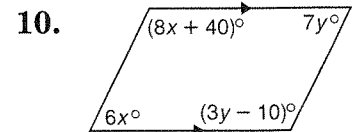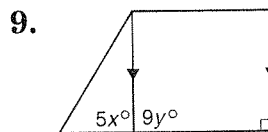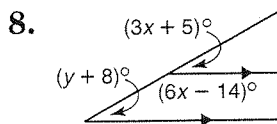
In the figure at the right $p \parallel q$, $m\angle 1 = 78$, and $m\angle 2 = 47$. Find the measure of each angle.
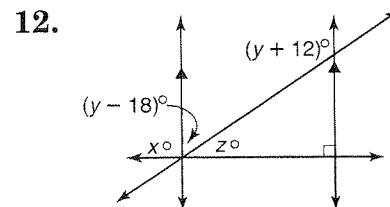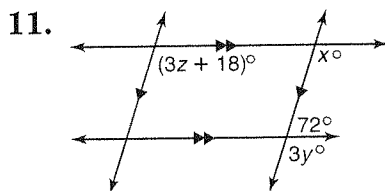

1. $\angle 3$ 2. $\angle 4$ 3. $\angle 5$

4. $\angle 6$ 5. $\angle 7$ 6. $\angle 8$ 7. $\angle 9$

Find the values of x and y in each figure.

8.

$(3x + 5)^\circ$
$(y + 8)^\circ$
$(6x - 14)^\circ$

9.

$5x^\circ$ $9y^\circ$

10.

$(8x + 40)^\circ$ $7y^\circ$
$6x^\circ$ $(3y - 10)^\circ$

Find the values of x, y and z in each figure.

11.

$(3z + 18)^\circ$ x°
72°
$3y^\circ$

12.

$(y + 12)^\circ$
$(y - 18)^\circ$
x° z°
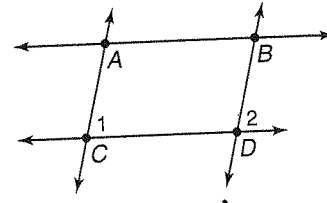
3-4

Study Guide

Proving Lines Parallel

Suppose two lines in a plane are cut by a transversal. With enough information about the angles that are formed, you can decide whether the two lines are parallel.

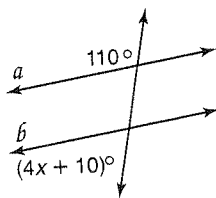| IF	THEN
Corresponding angles are congruent, Alternate interior angles are congruent, Alternate exterior angles are congruent, Consecutive interior angles are supplementary, The lines are perpendicular to the same line,	the lines are parallel.

Example: If $\angle 1 = \angle 2$, which lines must be parallel? Explain.

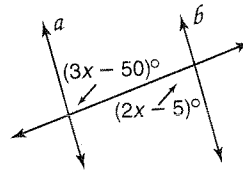$\overleftrightarrow{AC} \parallel \overleftrightarrow{BD}$ because a pair of corresponding angles are congruent.
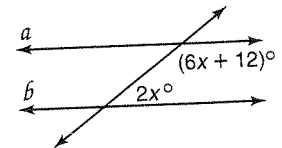

Find the value of x so that $a \parallel b$.

1.

$110°$
a
b
$(4x + 10)°$

2.

a b
$(3x - 50)°$
$(2x - 5)°$

3.

a
b
$(6x + 12)°$
$2x°$

4.

$(4x + 22)°$
a b
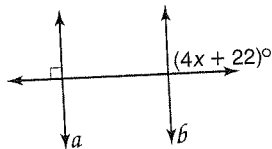
5.
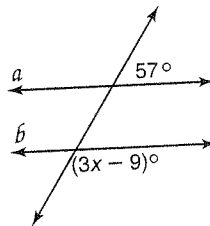
a
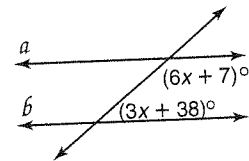b
$57°$
$(3x - 9)°$

6.

a
b
$(6x + 7)°$
$(3x + 38)°$

Given the following information, determine which lines, if any, are parallel. State the postulate or theorem that justifies your answer.

7. $\angle 1 \cong \angle 8$

8. $\angle 4 \cong \angle 9$

9. $m\angle 7 + m\angle 13 = 180$

10. $\angle 9 \cong \angle 13$

Geometry