Chapter 3
Parallel and Perpendicular Lines

3.1 - Pairs of Lines and Angles

3.2 - Parallel Lines and Transversals

3.3 - Proofs with Parallel Lines

3.4 - Proofs with Perpendicular Lines

3.5 - Equations of Parallel and Perpendicular Lines

3.2 - Parallel Lines and Transversals

Theorems

Corresponding Angles Theorem

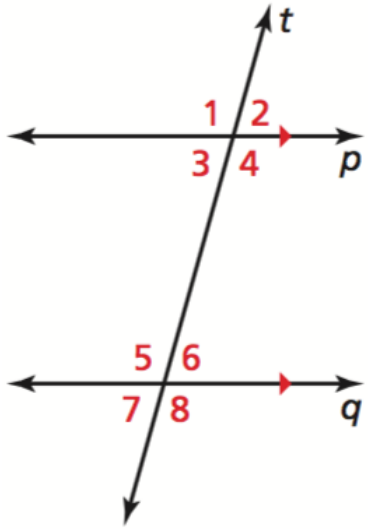
If two parallel lines are cut by a transversal, then the pairs of corresponding angles are congruent.

In the diagram, $\angle 2 \cong \angle 6$ and $\angle 3 \cong \angle 7$.

Alternate Interior Angles Theorem

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

In the diagram, $\angle 3 \cong \angle 6$ and $\angle 4 \cong \angle 5$.



3.2 - Parallel Lines and Transversals

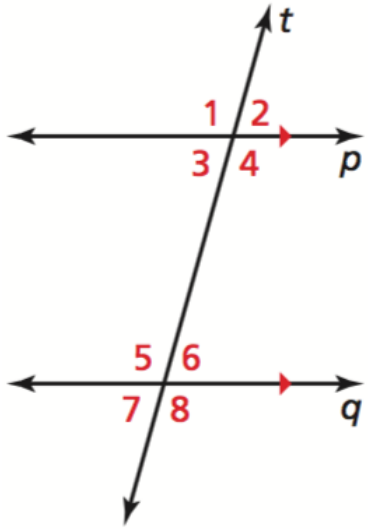
Theorems

Alternate Exterior Angles Theorem	If two parallel lines are cut by a transversal, then the pairs of alternate exterior angles are congruent.

In the diagram, $\angle 2 \cong \angle 7$ and $\angle 1 \cong \angle 8$.

Consecutive (Same-side) Interior Angles Theorem	If two parallel lines are cut by a transversal, then the pairs of consecutive (same-side) interior angles are supplementary.

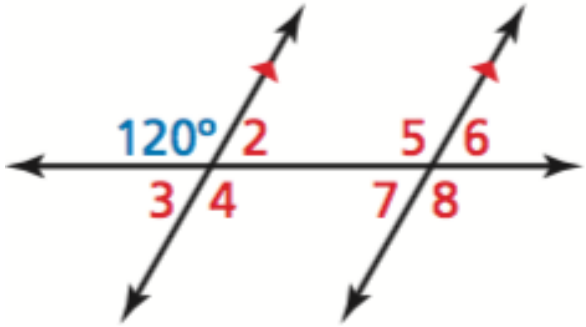
In the diagram, $\angle 3$ and $\angle 5$ are supplementary.



3.2 - Parallel Lines and Transversals

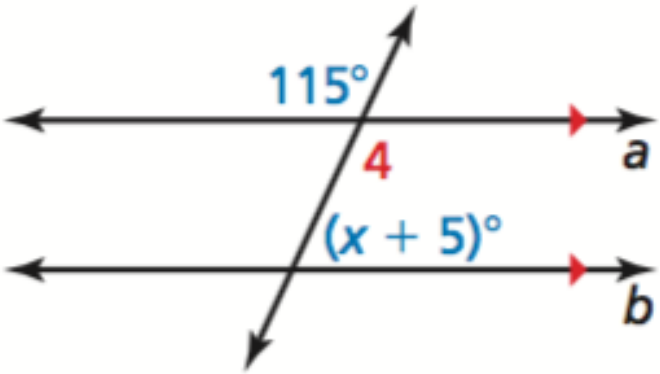
Solve Using Parallel Line Theorems

1) Determine all the angles using the postulates and theorems we just learned.

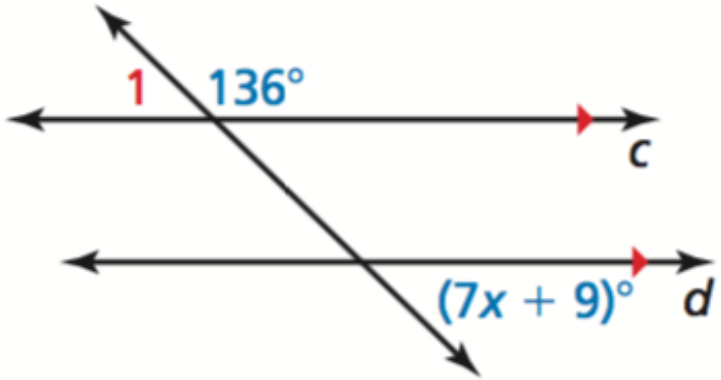


2) Determine the value of x.

a)



b)

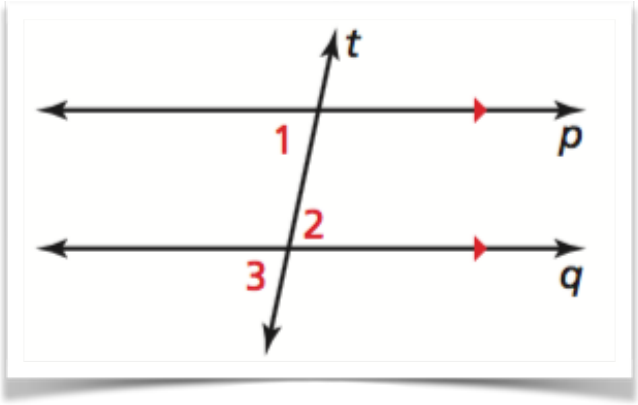


3.2 - Parallel Lines and Transversals

Prove the Alternate Interior Angles Theorem

Given $p \parallel q$

Prove $\angle 1 \cong \angle 2$



Statement	Reason