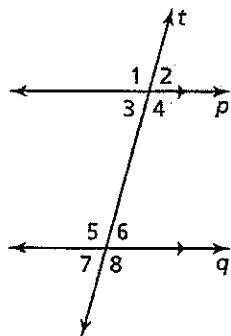


Properties of Parallel Lines

Lesson Objective

INBAT find angle measures using relationships of $\parallel$ lines + transversals

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



$$\angle 1 \cong \angle 5$$

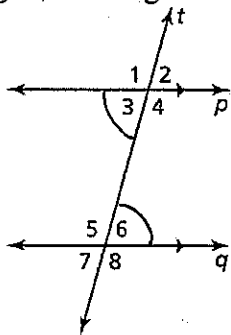
$$\angle 2 \cong \angle 6$$

$$\angle 3 \cong \angle 7$$

$$\angle 4 \cong \angle 8$$

if $\parallel \rightarrow$ corresp $\angle$'s $\cong$

Alternate Interior Angles Theorem: If two lines are cut by a transversal, then the pairs of alternate interior angles are congruent.



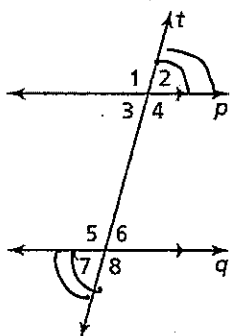
PROOF: see HW #3-2, problem #1!

$$\angle 3 \cong \angle 6$$

$$\angle 4 \cong \angle 5$$

if $\parallel \rightarrow$ alt. int. $\angle$'s $\cong$

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



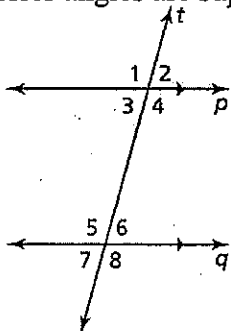
PROOF: see HW #3-2, problem #2!

$$\angle 2 \cong \angle 7$$

$$\angle 1 \cong \angle 8$$

if $\parallel \rightarrow$ alt. ext. $\angle$'s $\cong$

Consecutive Interior Angles Theorem: If two lines are cut by a transversal, then the pairs of consecutive interior angles are supplementary.



PROOF: see HW #3-2, problem #3!

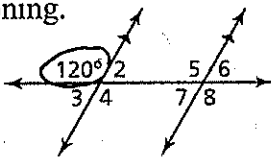
$\angle 4$ and $\angle 5$
are supp.

$\angle 3$ and $\angle 6$
are supp.

if $\parallel \rightarrow$ consec. int.
 $\angle$'s supp.

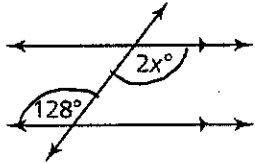
Examples:

1. The measures of three of the numbered angles are 120° . Identify the angles. Briefly explain your reasoning.



$\angle 5$: corresp. w/ given $\angle$
 $\angle 4$: vertical w/ given $\angle$
 $\angle 8$: alt. ext. w/ given $\angle$

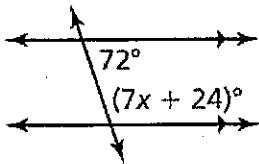
2. Find the value of x . State the Postulate or Theorem you used to make your first equation.



$$128 = 2x \quad \text{if } \parallel \rightarrow \text{alt. int. } \angle\text{'s} \cong$$

$$\boxed{64 = x}$$

3. Find the value of x . State the Postulate or Theorem you used to make your first equation.



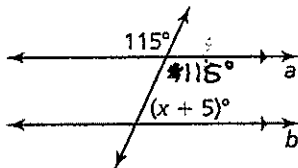
$$72 + 7x + 24 = 180 \quad \text{if } \parallel \rightarrow \text{consec. int. } \angle\text{'s supp.}$$

$$7x + 96 = 180$$

$$7x = 84$$

$$\boxed{x = 12}$$

4. Find the value of x .

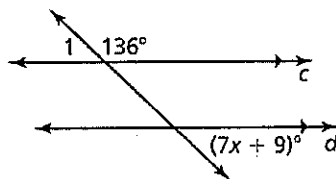


$$x + 5 + 115 = 180$$

$$x + 120 = 180$$

$$\boxed{x = 60}$$

5. Find the value of x .



6. In the diagram, $\angle 4 \cong \angle 5$ and $\overline{SE}$ bisects $\angle RSF$. Find $m\angle 1$.

