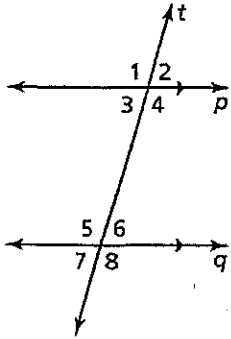


Properties of Parallel Lines

and use

Lesson Objective **INBAT** ^{and use} prove theorems about angle relationships and // lines.

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



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

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

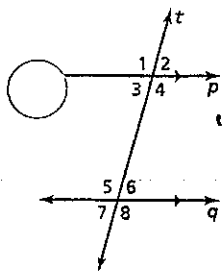
$$\angle 3 \cong \angle 7$$

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

"// $\rightarrow$ corresp. $\angle$ s $\cong$ "

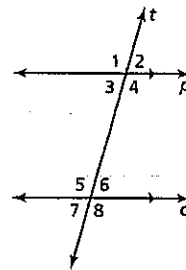
Alternate Interior Angles Theorem: If two parallel lines are cut by a transversal, then the pairs of alternate interior angles are congruent.

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



PROOF: on pg. 134, example #4

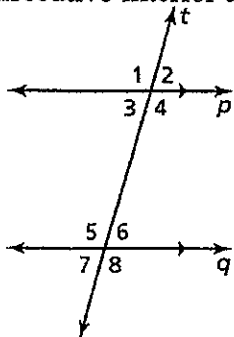
"// $\rightarrow$ alt. int. $\angle$ s $\cong$ "



PROOF: See HW #3-3, #15!

"// $\rightarrow$ alt. ext. $\angle$ s $\cong$ "

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



PROOF:

Given: $p \parallel q$

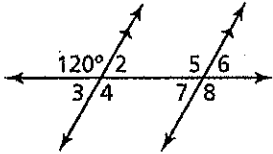
Prove: $\angle 4$ and $\angle 6$ are supp.

"// $\rightarrow$ consec. int. $\angle$ s supp"

Statements	Reasons
① $p \parallel q$	① given
② $\angle 3$ and $\angle 4$ are supp	② linear pairs are supp
③ $m\angle 3 + m\angle 4 = 180$	③ def. of supp $\angle$ s
④ $\angle 3 \cong \angle 6$	④ // $\rightarrow$ alt. int. $\angle$ s $\cong$
⑤ $m\angle 3 = m\angle 6$	⑤ $\cong \rightarrow =$
⑥ $m\angle 6 + m\angle 4 = 180$	⑥ subst. prop. =
⑦ $\angle 4$ and $\angle 6$ are supp	⑦ def. of supp $\angle$ s

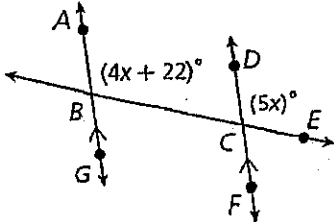
Examples:

1. The measures of three of the numbered angles are 120° . Identify the angles.



$\angle 3, \angle 4, \angle 5$

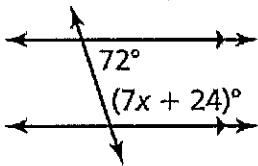
2. Find the value of x . State the Postulate or Theorem you used to make your first equation.



$$4x + 22 = 5x \quad // \rightarrow \text{corresp. } \angle s \cong$$

$$\boxed{x = 22}$$

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



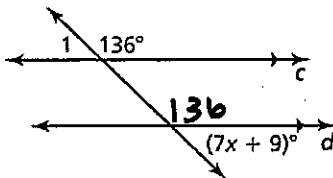
$$7x + 24 + 72 = 180 \quad // \rightarrow \text{consec. int. } \angle s \text{ supp}$$

$$7x + 96 = 180$$

$$7x = 84$$

$$\boxed{x = 12}$$

4. Find the value of x .

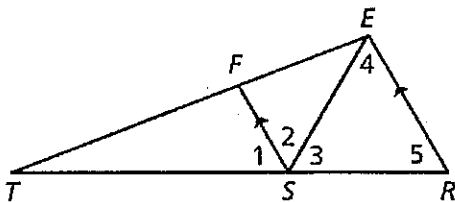


$$7x + 9 + 136 = 180$$

$$7x = 35$$

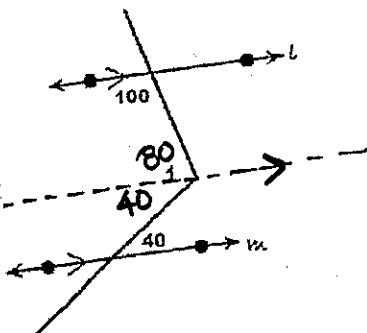
$$\boxed{x = 5}$$

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



hW problem...

6. Find $m\angle 1$. (HINT: draw an auxiliary line parallel to the two shown)



$$m\angle 1 = 80 + 40 = \boxed{120^\circ}$$