

3.2

Use Parallel Lines and Transversals

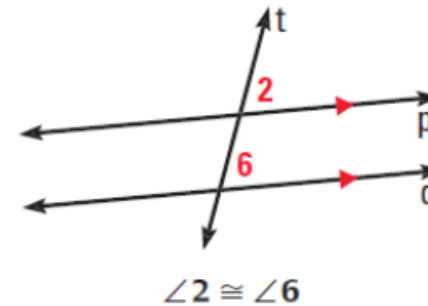
- Goal**
- Use angles formed by parallel lines and transversals.

POSTULATE

For Your Notebook

POSTULATE 15 Corresponding Angles Postulate

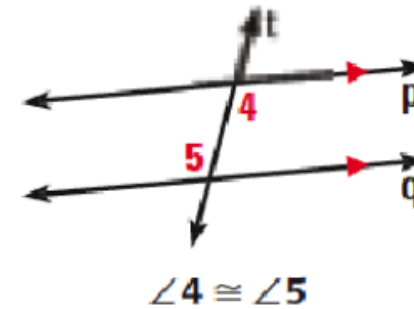
If two parallel lines are cut by a transversal, then the pairs of corresponding angles are congruent.



THEOREM 3.1 Alternate Interior Angles Theorem

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

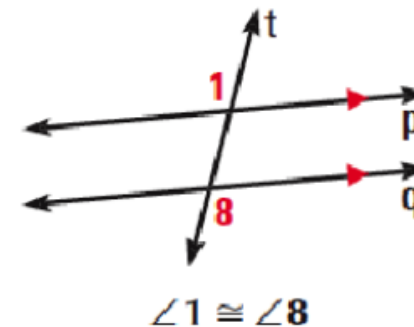
Proof: Example 3, p. 156



THEOREM 3.2 Alternate Exterior Angles Theorem

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

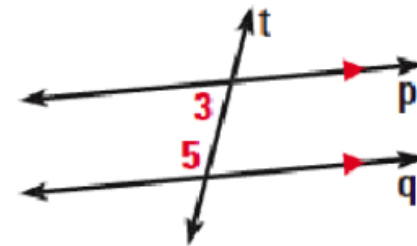
Proof: Ex. 37, p. 159



THEOREM 3.3 Consecutive Interior Angles Theorem

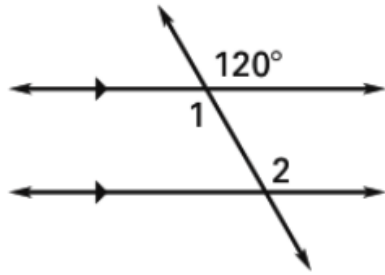
If two parallel lines are cut by a transversal, then the pairs of consecutive interior angles are supplementary.

Proof: Ex. 41, p. 159

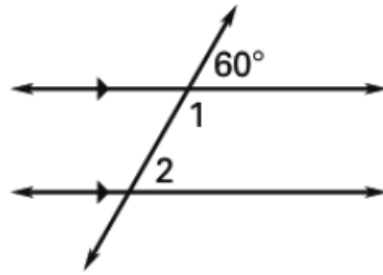


$\angle 3$ and $\angle 5$ are supplementary.

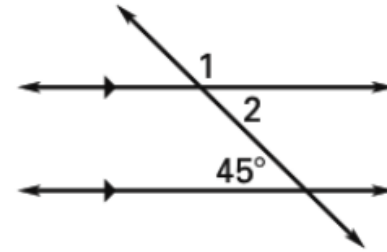
5.

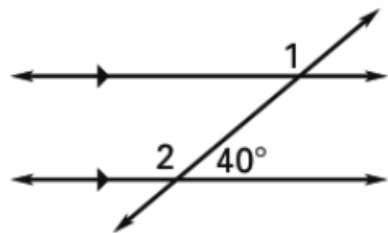
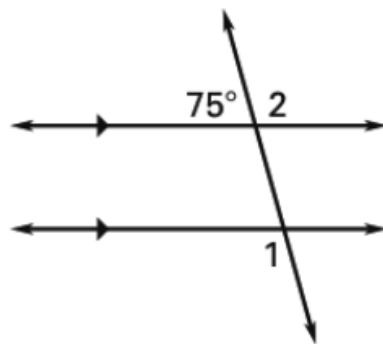
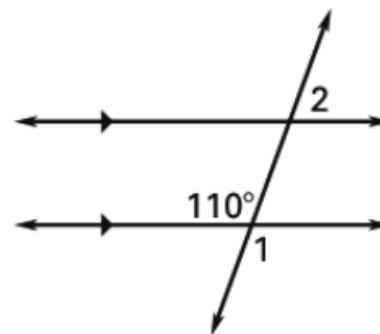


6.



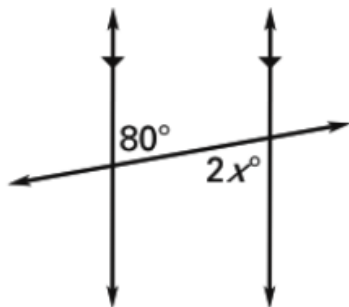
7.



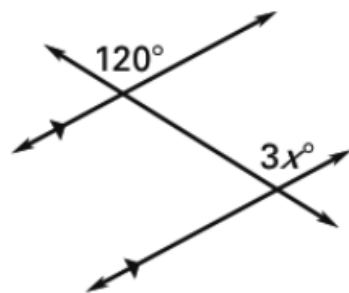
8.**9.****10.**

Find the value of x .

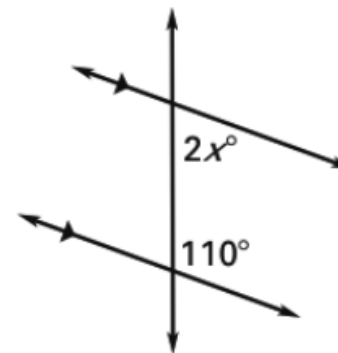
17.



18.

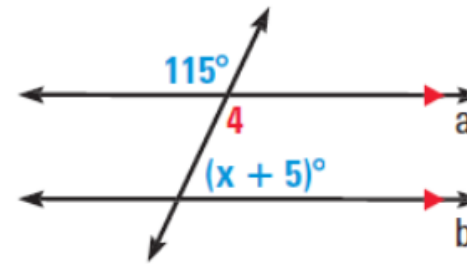


19.



EXAMPLE 2 Use properties of parallel lines

xy ALGEBRA Find the value of x .



EXAMPLE 3 Prove the Alternate Interior Angles Theorem

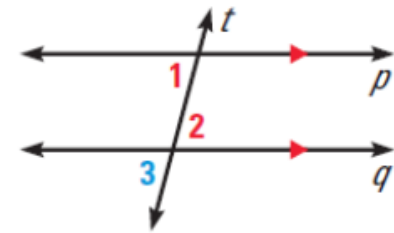
Prove that if two parallel lines are cut by a transversal, then the pairs of alternate interior angles are congruent.

Solution

Draw a diagram. Label a pair of alternate interior angles as $\angle 1$ and $\angle 2$. You are looking for an angle that is related to both $\angle 1$ and $\angle 2$. Notice that one angle is a vertical angle with $\angle 2$ and a corresponding angle with $\angle 1$. Label it $\angle 3$.

GIVEN $\triangleright p \parallel q$

PROVE $\triangleright \angle 1 \cong \angle 2$



WRITE PROOFS

You can use the information from the diagram in your proof. Find any special angle pairs. Then decide what you know about those pairs.

STATEMENTS

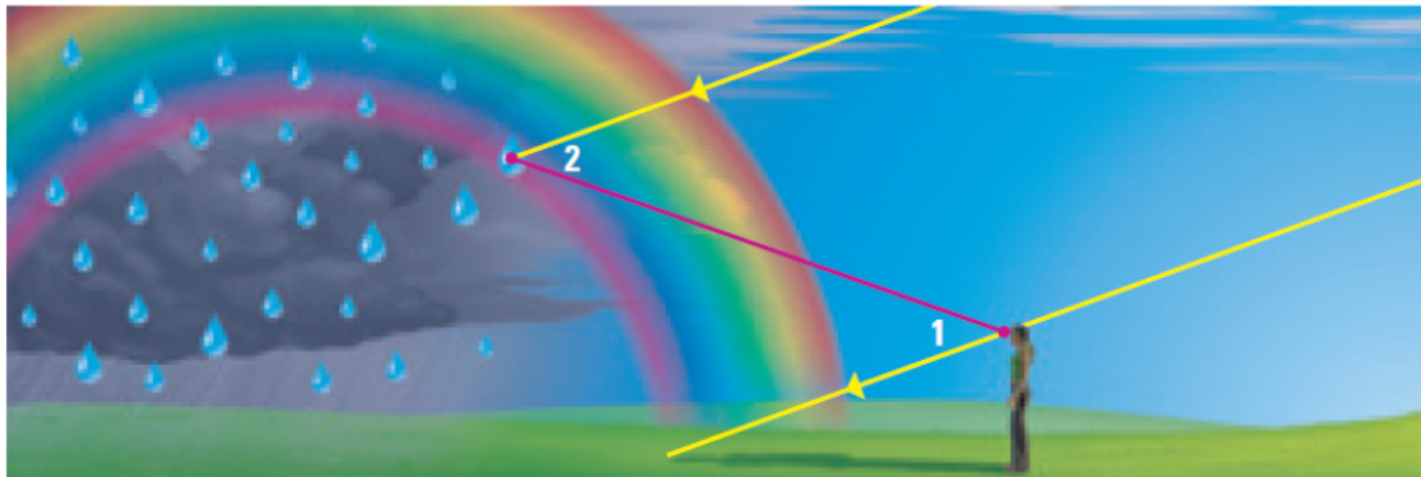
1. $p \parallel q$
2. $\angle 1 \cong \angle 3$
3. $\angle 3 \cong \angle 2$
4. $\angle 1 \cong \angle 2$

REASONS

1. Given
2. Corresponding Angles Postulate
3. Vertical Angles Congruence Theorem
4. Transitive Property of Congruence

EXAMPLE 4 Solve a real-world problem

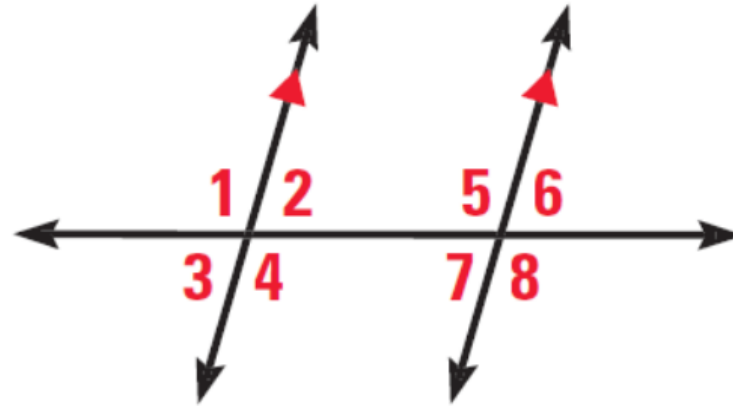
SCIENCE When sunlight enters a drop of rain, different colors of light leave the drop at different angles. This process is what makes a rainbow. For violet light, $m\angle 2 = 40^\circ$. What is $m\angle 1$? How do you know?



Solution



If $m\angle 1 = 105$, find all the other angle measures.



Assignment:

p. 157 (1-20 all, 22-33 all, 35, 45-52)