

LESSON

2.6

The greatest mistake you can make in life is to be continually fearing that you will make one.

ELLEN HUBBARD

Special Angles on Parallel Lines

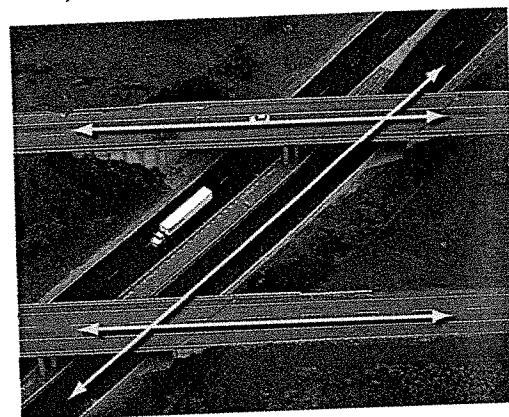
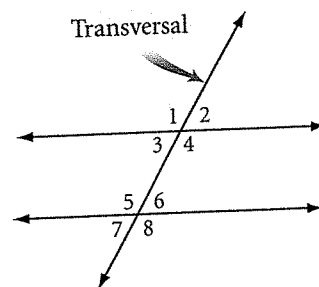
A line intersecting two or more other lines in the plane is called a **transversal**. A transversal creates different types of angle pairs. Three types are listed below.

One pair of **corresponding angles** is $\angle 1$ and $\angle 5$. Can you find three more pairs of corresponding angles?

One pair of **alternate interior angles** is $\angle 3$ and $\angle 6$. Do you see another pair of alternate interior angles?

One pair of **alternate exterior angles** is $\angle 2$ and $\angle 7$. Do you see the other pair of alternate exterior angles?

When parallel lines are cut by a transversal, there is a special relationship among the angles. Let's investigate.

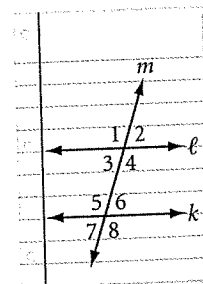


Investigation 1 Which Angles Are Congruent?

You will need

- lined paper
- a straightedge
- patty paper
- a protractor (optional)

Using the lines on your paper as a guide, draw a pair of parallel lines. Or use both edges of your ruler or straightedge to create parallel lines. Label them k and ℓ . Now draw a transversal that intersects the parallel lines. Label the transversal m , and label the angles with numbers, as shown at right.

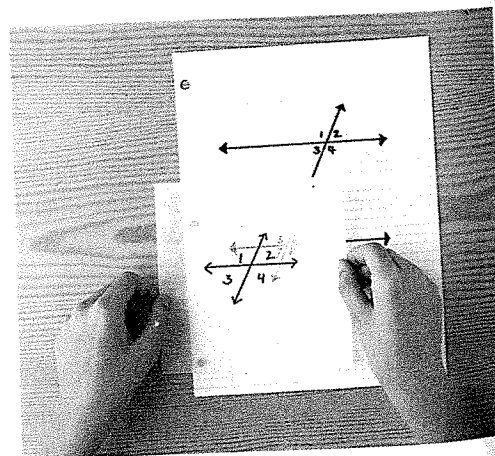


Step 1

Place a piece of patty paper over the set of angles 1, 2, 3, and 4. Copy the two intersecting lines m and ℓ and the four angles onto the patty paper.

Step 2

Slide the patty paper down to the intersection of lines m and k , and compare angles 1 through 4 with each of the corresponding angles 5 through 8. What is the relationship between corresponding angles? Alternate interior angles? Alternate exterior angles?

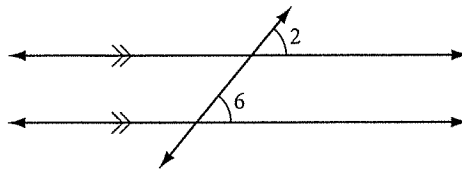


Compare your results with the results of others in your group and complete the three conjectures below.

Corresponding Angles Conjecture, or CA Conjecture

C-3a

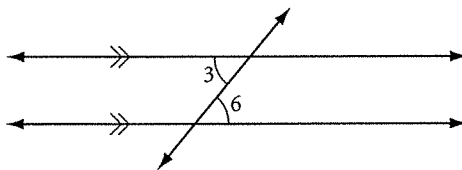
If two parallel lines are cut by a transversal, then corresponding angles are ?.



Alternate Interior Angles Conjecture, or AIA Conjecture

C-3b

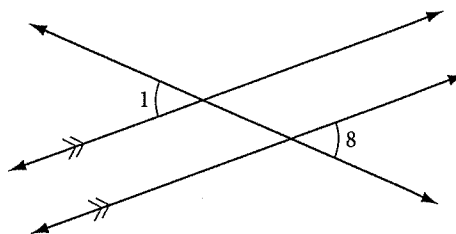
If two parallel lines are cut by a transversal, then alternate interior angles are ?.



Alternate Exterior Angles Conjecture, or AEA Conjecture

C-3c

If two parallel lines are cut by a transversal, then alternate exterior angles are ?.



The three conjectures you wrote can all be combined to create a Parallel Lines Conjecture, which is really three conjectures in one.

Parallel Lines Conjecture

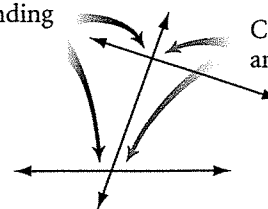
C-3

If two parallel lines are cut by a transversal, then corresponding angles are ?, alternate interior angles are ?, and alternate exterior angles are ?.

Step 3

What happens if the lines you start with are not parallel? Check whether your conjectures will work with nonparallel lines.

Corresponding angles



Corresponding angles