

Lesson 2.5: Angle Relationships

In this lesson you will:

- make a conjecture about angles that form a linear pair
- make and prove a conjecture about pairs of vertical angles
- write the converse of an “if-then” statement and determine whether it is true

Investigation 2.5.1: “Angle Relationships”

A.) On a sheet of paper, draw \overleftrightarrow{PQ} and place a point R between P and Q . Choose another point S not on \overleftrightarrow{PQ} and draw \overleftrightarrow{RS} . You have just created a linear pair of angles.

Place the “zero edge” of your protractor along \overleftrightarrow{PQ} . What do you notice about the sum of the measures of the linear pair of angles?

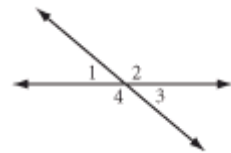
B.) Compare your results with those of your group. Does everyone make the same observation?

C.) Complete the “Linear Pair Conjecture” below.

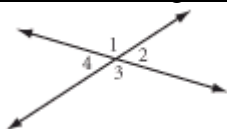
Linear Pair Conjecture (C-1)

If two angles form a linear pair, then _____.

In the previous investigation you discovered the relationship between a linear pair of angles, such as $\angle 1$ and $\angle 2$ in the diagram at right. You will discover the relationship between vertical angles, such as $\angle 1$ and $\angle 3$, in the next investigation.



Investigation 2.5.2: “Vertical Angle Conjecture”

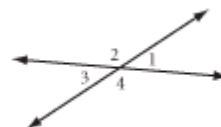


- A.) Draw two intersecting lines onto patty paper or tracing paper. Label the angles as shown. Which angles are vertical angles?
- B.) Fold the paper so that the vertical angles lie over each other. What do you notice about their measures?
- C.) Fold the paper so that the other pair of vertical angles lie over each other. What do you notice about their measures?
- D.) Compare your results with the results of others, and then complete the conjecture below.

Vertical Angles Conjecture (C-2)

If two angles are vertical angles, then _____.

●Example 1: Use the Linear Pair Conjecture and the diagram at right to write a deductive argument explaining why $\angle 1$ must be congruent to $\angle 3$.



The **converse** of an “if-then” statement switches the “if” and “then” parts. Is the converse of the Vertical Angles Conjecture true? (Converse: If two angles are congruent, then they are vertical angles.) Remember that if you can find even one counterexample, then the statement is false. *Add “converse” to your dictionary!*

*converse: the statement formed by exchanging the “if” clause and the “then” clause of a conditional statement.

⇒**ASSIGNMENT**: _____