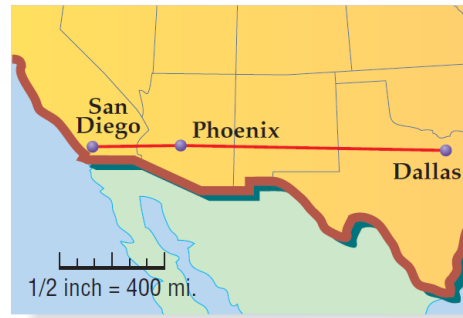


## 2-7 Proving Segment Relationships

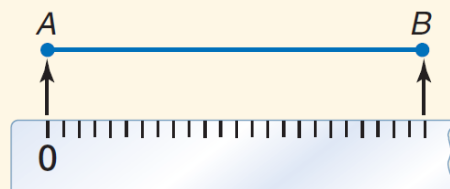
When leaving San Diego, the pilot said that the flight would be about 360 miles to Phoenix. When the plane left Phoenix, the pilot said that the flight would be about 1070 miles to Dallas. Distances in a straight line on a map are sometimes measured with a ruler.



How long is the entire flight,  
from San Diego to Dallas?

### The Ruler Postulate

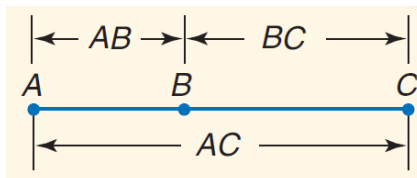
The points on any line or line segment can be paired with real numbers so that, given any two points  $A$  and  $B$  on a line,  $A$  corresponds to zero, and  $B$  corresponds to a positive real number.



## The Segment Addition Postulate

If  $A$ ,  $B$ , and  $C$  are collinear and  $B$  is between  $A$  and  $C$ , then  $AB + BC = AC$ .

If  $AB + BC = AC$ , then  $B$  is between  $A$  and  $C$ .



Try it:

### Proof With Segment Addition

Prove the following.

**Given:**  $PQ = RS$

**Prove:**  $PR = QS$

**Proof:**



Statements	Reasons
1.	1.
2.	2.
3.	3.
4.	4.

## Got it?

## Proof:

Statements	Reasons
1. $PQ = RS$	1. Given
2. $PQ + QR = QR + RS$	2. Addition Property
3. $PQ + QR = PR$ $QR + RS = QS$	3. Segment Addition Postulate
4. $PR = QS$	4. Substitution

## Your turn:

Given:  $PR = QS$ Prove:  $PQ = RS$ 

More properties to use:

Reflexive Property of Segment Congruence:

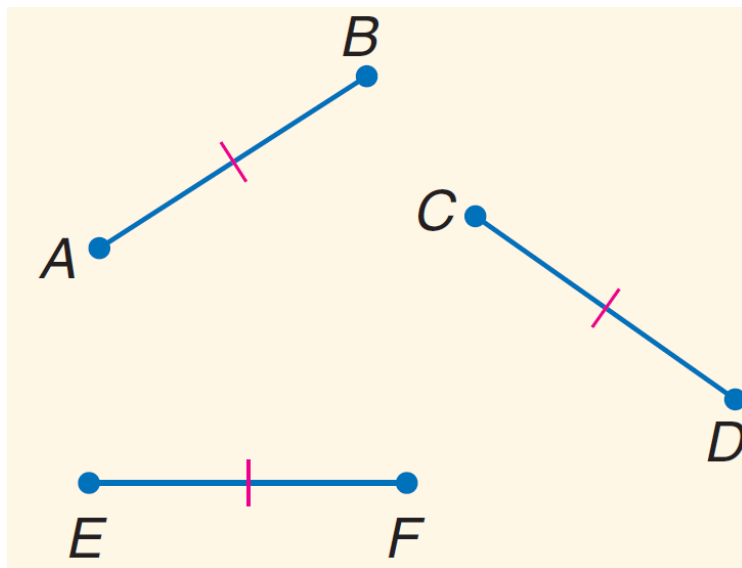
$$\overline{AB} \cong \overline{AB}$$

Symmetric Property of Segment Congruence:

$$\text{If } \overline{AB} \cong \overline{CD}, \text{ then } \overline{CD} \cong \overline{AB}.$$

Transitive Property of Segment Congruence:

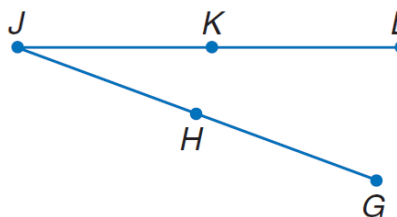
$$\text{If } \overline{AB} \cong \overline{CD}, \text{ and } \overline{CD} \cong \overline{EF}, \\ \text{then } \overline{AB} \cong \overline{EF}.$$



## Try it:

**Proof With Segment Congruence**

Prove the following.

**Given:**  $\overline{JK} \cong \overline{KL}$ ,  $\overline{HJ} \cong \overline{GH}$ ,  $\overline{KL} \cong \overline{HJ}$ **Prove:**  $\overline{GH} \cong \overline{JK}$ **Proof:**

Statements	Reasons
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

## Got it?

Statements	Reasons
1. $\overline{JK} \cong \overline{KL}$ , $\overline{KL} \cong \overline{HJ}$	1. Given
2. $\overline{JK} \cong \overline{HJ}$	2. Transitive Property
3. $\overline{HJ} \cong \overline{GH}$	3. Given
4. $\overline{JK} \cong \overline{GH}$	4. Transitive Property
5. $\overline{GH} \cong \overline{JK}$	5. Symmetric Property

**To summarize:  
In addition to algebraic  
properties, and the postulates  
and theorem we have already  
seen, we have some new  
"ingredients" we can use to  
build proofs. They are:**

- **The Ruler Postulate**
- **Segment Addition Postulate**
- **Reflexive Property of  
Segment Congruence**
- **Symmetric Property of  
Segment Congruence**
- **Transitive Property of  
Segment Congruence**