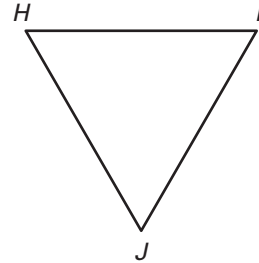




**In Exercises 1–4, copy and complete the proof.**

1. **GIVEN:**  $HI = 9$ ,  $IJ = 9$ ,  $\overline{IJ} \cong \overline{JH}$

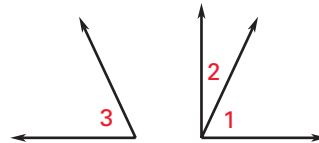
**PROVE:**  $\overline{HI} \cong \overline{JH}$



Statements	Reasons
1. $HI = 9$ , $IJ = 9$	1. <u>?</u>
2. $HI = IJ$	2. <u>?</u>
3. <u>?</u>	3. Definition of congruent segments
4. $\overline{IJ} \cong \overline{JH}$	4. <u>?</u>
5. $\overline{HI} \cong \overline{JH}$	5. <u>?</u>

2. **GIVEN:**  $\angle 3$  and  $\angle 2$  are complementary.  
 $m\angle 1 + m\angle 2 = 90^\circ$

**PROVE:**  $\angle 1 \cong \angle 3$



Statements	Reasons
1. $\angle 3$ and $\angle 2$ are complementary, and $m\angle 1 + m\angle 2 = 90^\circ$	1. <u>?</u>
2. $m\angle 3 + m\angle 2 = 90^\circ$	2. <u>?</u>
3. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$	3. <u>?</u>
4. $m\angle 1 = m\angle 3$	4. <u>?</u>
5. $\angle 1 \cong \angle 3$	5. <u>?</u>

3. **GIVEN:**  $AL = SK$

**PROVE:**  $AS = LK$

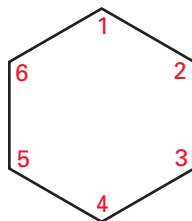


Statements	Reasons
1. $AL = SK$	1. <u>?</u>
2. $LS = LS$	2. <u>?</u>
3. $AL + LS = SK + LS$	3. <u>?</u>
4. $AL + LS = AS$	4. <u>?</u>
5. $SK + LS = LK$	5. <u>?</u>
6. $AS = LK$	6. <u>?</u>

## Exercise Set A (continued)

4. **GIVEN:**  $m\angle 4 = 120^\circ$ ,  $\angle 2 \cong \angle 5$ ,  $\angle 5 \cong \angle 4$

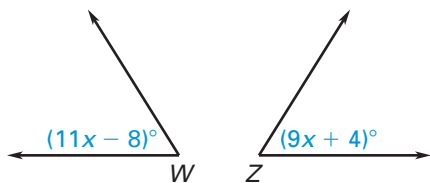
**PROVE:**  $m\angle 2 = 120^\circ$



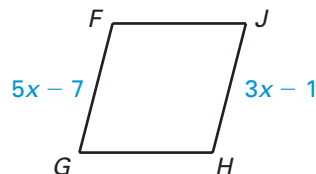
Statements	Reasons
1. $m\angle 4 = 120^\circ$ , $\angle 2 \cong \angle 5$ , $\angle 5 \cong \angle 4$	1. ?
2. $\angle 2 \cong \angle 4$	2. ?
3. ?	3. Definition of congruent angles
4. $m\angle 2 = 120^\circ$	4. ?

**Solve for  $x$  using the given information. Explain your steps.**

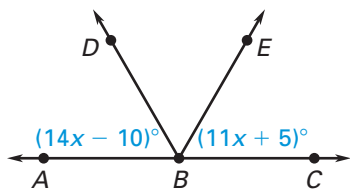
5.  $\angle W \cong \angle Z$



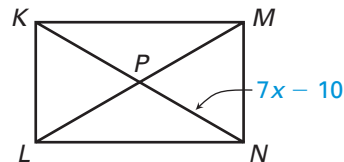
6.  $\overline{FG} \cong \overline{FJ}$ ,  $\overline{FJ} \cong \overline{JH}$



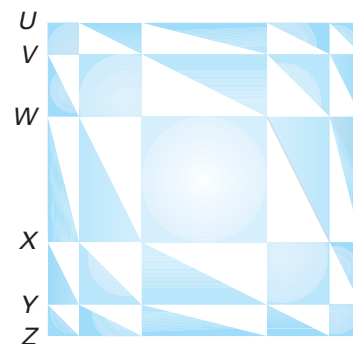
7.  $\angle ABD \cong \angle DBE$ ,  $\angle DBE \cong \angle EBC$



8.  $\overline{KP} \cong \overline{PN}$ ,  $KP = 18$



9. **Optical Illusion** To create the illusion at the right, a special grid was used. In the grid, corresponding row heights are the same measure. For instance,  $\overline{UV}$  and  $\overline{ZY}$  are congruent. You decide to make this design yourself. You draw the grid, but you need to make sure that the row heights are the same. You measure  $\overline{UV}$ ,  $\overline{UW}$ ,  $\overline{ZY}$ , and  $\overline{ZX}$ . You find that  $\overline{UV} \cong \overline{ZY}$  and  $\overline{UW} \cong \overline{ZX}$ . Write an argument that allows you to conclude that  $\overline{VW} \cong \overline{YX}$ .

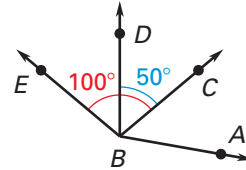




**In Exercises 1 and 2, copy and complete the proof.**

1. **GIVEN:**  $\angle ABC \cong \angle CBD$ ,  $m\angle CBD = 50^\circ$ ,  
 $m\angle CBE = 100^\circ$

**PROVE:**  $\angle ABC \cong \angle DBE$

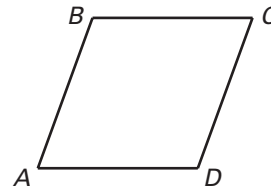


Statements	Reasons
1. $\angle ABC \cong \angle CBD$ , $m\angle CBD = 50^\circ$ , $m\angle CBE = 100^\circ$	1. ?
2. $\underline{\quad ? \quad} = m\angle CBE$	2. Angle Addition Postulate
3. $50^\circ + m\angle DBE = 100^\circ$	3. ?
4. $m\angle DBE = 50^\circ$	4. ?
5. $m\angle CBD = \underline{\quad ? \quad}$	5. Substitution Property of Equality
6. $\underline{\quad ? \quad}$	6. Definition of congruent angles
7. $\angle ABC \cong \angle DBE$	7. ?

2. The lengths of the sides of quadrilateral  $ABCD$  are congruent. Prove that the perimeter of  $ABCD$  is equal to  $4AB$ .

**GIVEN:**  $\overline{AB} \cong \overline{BC}$ ,  $\overline{BC} \cong \overline{CD}$ ,  $\overline{CD} \cong \overline{AD}$

**PROVE:** Perimeter of  $ABCD = 4AB$



Statements	Reasons
1. $\overline{AB} \cong \overline{BC}$ , $\overline{BC} \cong \overline{CD}$ , $\overline{CD} \cong \overline{AD}$	1. ?
2. $AB = BC$ , $BC = CD$ , $CD = AD$	2. ?
3. $AB = CD$ , $AB = AD$	3. ?
4. Perimeter of $ABCD = AB + BC + CD + AD$	4. ?
5. $\underline{\quad ? \quad}$	5. Substitution Property of Equality
6. $\underline{\quad ? \quad}$	6. Simplify.

**Use the property to complete the statement.**

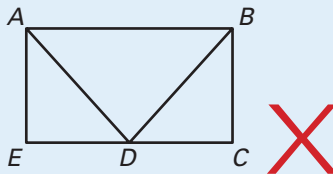
3. Transitive Property of Congruence: If  $\angle 1 \cong \angle 5$  and  $\underline{\quad ? \quad}$ , then  $\angle 1 \cong \angle 7$ .
4. Symmetric Property of Congruence: If  $\angle 1 \cong \angle 2$  and  $\angle 3 \cong \angle 4$ , then  $\underline{\quad ? \quad}$ .

## Exercise Set B *(continued)*

Name the property illustrated by the statement.

- $\angle ABC \cong \angle CBA$
- If  $\angle RST \cong \angle 5$ , then  $\angle 5 \cong \angle RST$ .
- If  $\overline{QS} \cong \overline{XR}$  and  $\overline{RX} \cong \overline{SX}$ , then  $\overline{QS} \cong \overline{SX}$ .
- Error Analysis** In the diagram below,  $\overline{BC} \cong \overline{AE}$  and  $\overline{AE} \cong \overline{DC}$ . Describe and correct the error in the reasoning.

Because  $\overline{BC} \cong \overline{AE}$  and  $\overline{AE} \cong \overline{DC}$ , then  $\overline{BC} \cong \overline{DC}$  by the Reflexive Property of Segment Congruence.

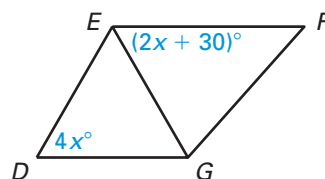


Solve for  $x$  using the given information. Explain your steps.

- GIVEN:**  $S$  is the midpoint of  $\overline{RT}$ .  
 $T$  is the midpoint of  $\overline{SU}$ .



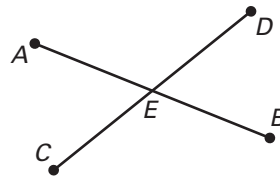
- GIVEN:**  $\angle D \cong \angle DEG$ ,  
 $\overline{EG}$  bisects  $\angle DEF$ .



- Proof** Write a two-column proof.

**GIVEN:**  $\overline{AE} \cong \overline{CE}$   
 $\overline{AB}$  and  $\overline{CD}$  bisect each other.

**PROVE:**  $\overline{EB} \cong \overline{ED}$



- Marching Band** A marching band forms a *company front*, with all of the musicians in a straight line facing the audience. In this formation, Leon is halfway between Marge and Clay, Jade is halfway between Marge and Leon, and Ariel is halfway between Leon and Clay. Use the following steps to prove that the distance between Marge and Jade is the same as the distance between Ariel and Clay.
  - Draw a diagram that represents the five musicians mentioned.
  - Draw separate diagrams to show mathematical relationships.
  - State what is given and what is to be proved.
  - Write a two-column proof.