Name ______________________________ Date ______________

LESSON 2.6

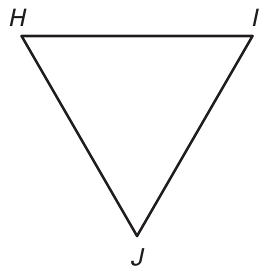
Practice B

For use with pages 113–120

In Exercises 1–4, complete the proof.

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

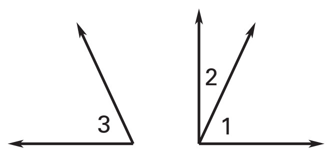
PROVE: $\overline{HI} \cong \overline{JH}$



Statements	Reasons
1. $HI = 9$	1. ?
2. $IJ = 9$	2. ?
3. $HI = IJ$	3. ?
4. ?	4. Definition of congruent segments
5. $\overline{IJ} \cong \overline{JH}$	5. ?
6. $\overline{HI} \cong \overline{JH}$	6. ?

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

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



Statements	Reasons
1. $\angle 3$ and $\angle 2$ are complementary.	1. ?
2. $m\angle 1 + m\angle 2 = 90°$	2. ?
3. $m\angle 3 + m\angle 2 = 90°$	3. ?
4. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$	4. ?
5. $m\angle 1 = m\angle 3$	5. ?
6. $\angle 1 \cong \angle 3$	6. ?

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

PROVE: $AS = LK$

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

LESSON 2.6

Name ______________________ Date ____________

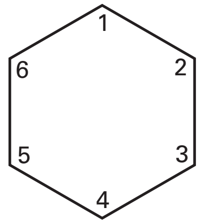
LESSON 2.6

Practice B *continued*

For use with pages 113–120

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

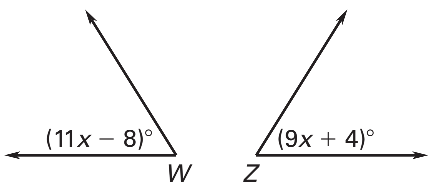
PROVE: $m\angle 2 = 120°$



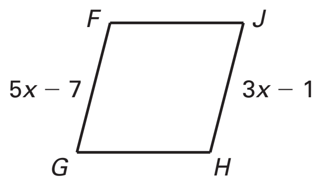
Statements	**Reasons**
1. $m\angle 4 = 120°$, $\angle 2 \cong \angle 5$, $\angle 4 \cong \angle 5$	**1.** _?_
2. $\angle 2 \cong \angle 4$	**2.** _?_
3. _?_	**3.** Definition of congruent angles
4. $m\angle 2 = 120°$	**4.** _?_

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

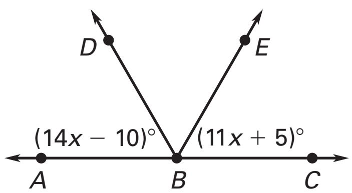
5. $\angle W \cong \angle Z$



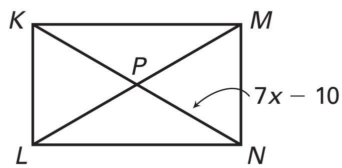
6. $\overline{FG} \cong \overline{FJ}$, $\overline{FJ} \cong \overline{JH}$



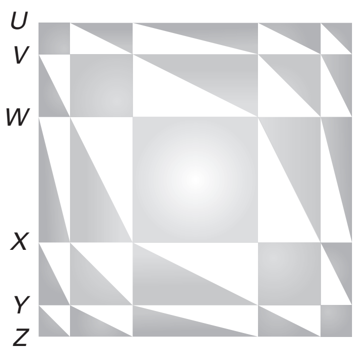
7. $\angle ABD \cong \angle DBE$, $\angle EBC \cong \angle DBE$



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 $\overline{VW} \cong \overline{YX}$.



ANSWERS

6. You are given that $AB = CD$. By the Addition Property of Equality, you can write $AB + BC = BC + CD$. You know that $AC = AB + BC$ and $BD = BC + CD$ by the Segment Addition Postulate. By the Substitution Property of Equality, you have $AC = BC + CD$. You are given $AC = 6x - 12$, $BC = 4$, and $CD = 3x - 2$. Substitute these expressions into the equation $AC = BC + CD$ to obtain $6x - 12 = 4 + 3x - 2$. Simplify the right side of the equation to obtain $6x - 12 = 3x + 2$. By the Subtraction Property of Equality you have $3x - 12 = 2$. Next, by the Addition Property of Equality you have $3x = 14$. Finally, by the Division Property of Equality, $x = \frac{14}{3}$. Substitute this value of x into the expression for CD to obtain $CD = 12$. Because you are given that $AB = CD$, you know that $AB = 12$ also.

7. $m\angle RPQ = m\angle RPS$ Given
$m\angle SPQ = m\angle RPQ + m\angle RPS$ Segment Addition Postulate
$m\angle SPQ = m\angle RPQ + m\angle RPQ$ Substitution Prop. of Equality
$m\angle SPQ = 2(m\angle RPQ)$ Simplify.

8. $a = b$ Given
$ac = bc$ Multiplication Prop. of Equality
$c = d$ Given
$bc = bd$ Multiplication Prop. of Equality
$ac = bd$ Substitution Prop. of Equality

9. You are given that a is a positive integer. Assume a is even. Then $a = 2k$, where k is a positive integer. Substitute $2k$ for a in $a + 1$ to obtain $2k + 1$. Because $2k$ is even, adding 1 to this expression produces an odd number. Therefore, $a + 1$ is odd.

Lesson 2.6

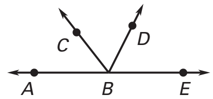
Practice Level A

1. Transitive Property of Equality; $\angle A \cong \angle C$

2. Given; $DE = DF$; Symmetric Property of Equality; $\overline{DF} \cong \overline{DE}$ **3.** $\angle 1$ and $\angle 2$ are a linear pair; $\angle 1$ and $\angle 2$ are supplementary; Definition of Supplementary Angles; $m\angle 1 = 180° - m\angle 2$

4. $\angle 4$ **5.** $\overline{DX}$; $\overline{CD}$ **6.** Transitive Property of Congruence **7.** Reflexive Property of Congruence **8.** Symmetric Property of Congruence **9.** Symmetric Property of Congruence

10. *Sample sketch:*



11. 1. $2m\angle ABC = m\angle ABD$ (Given)
2. $m\angle ABC + m\angle CBD = m\angle ABD$ (Angle Addition Postulate)
3. $2m\angle ABC = m\angle ABC + m\angle CBD$ (Transitive Property of Equality)
4. $m\angle ABC = m\angle CBD$ (Subtraction Property of Equality)
5. $\angle ABC \cong \angle CBD$ (Definition of congruent angles)

12. *Sample answer:* **a.**

b. Given: $AB = 95$, $CD = 95$ Prove: $AC = BD$

c. 1. $AB = 95$, $CD = 95$ (Given) **2.** $AB + BC = AC$, $CD + BC = BD$ (Segment Addition Postulate) **3.** $95 + BC = AC$, $95 + BC = BD$ (Substitution Property of Equality) **4.** $AC = 95 + BC$ (Symmetric Property of Equality) **5.** $AC = BD$ (Transitive Property of Equality)

Practice Level B

1. 1. Given **2.** Given **3.** Substitution Property of Equality **4.** $\overline{HI} \cong \overline{IJ}$ **5.** Given **6.** Transitive Property of Congruence

2. 1. Given **2.** Given **3.** Definition of complementary angles **4.** Transitive Property of Equality **5.** Subtraction Property of Equality **6.** Definition of congruent angles

3. 1. Given **2.** Reflexive Property of Equality **3.** Addition Property of Equality **4.** Segment Addition Postulate **5.** Segment Addition Postulate **6.** Substitution Property of Equality

4. 1. Given **2.** Transitive Property of Angle Congruence **3.** $m\angle 2 = m\angle 4$ **4.** Substitution Property of Equality

5. $x = 6$; Because the angles are congruent, the measures of the angles are congruent by the definition of congruent angles. Set the measure of the angles equal to each other to find x.

6. $x = 3$; By the transitive property, $\overline{FG} \cong \overline{JH}$. Set the lengths of the segments equal to each other to find x.

7. $x = 5$; By the transitive property, $\angle ABD \cong \angle EBC$. Because the angles are congruent, the measures of the angles are congruent by the definition of congruent angles. Set the measures of the angles equal to each other to find x.

8. $x = 4$; Because the segments are congruent, the lengths of the segments are congruent by the definition of congruent segments. Set the lengths of the segments equal to each other to find x.

9. $\overline{UV} \cong \overline{ZY}$, $\overline{UW} \cong \overline{ZX}$ (Given)
$UV = ZY$, $UW = ZX$ (Def. of $\cong$)
$VW = UW - UV$ (Segment Addition Postulate)
$YX = ZX - ZY$ (Segment Addition Postulate)
$YX = UW - UV$ (Substitution Property of Equality)
$VW = YX$ (Transitive Property of Equality)
$\overline{VW} \cong \overline{YX}$ (Def. of $\cong$)

Practice Level C

1. Given; $m\angle CBD + m\angle DBE$; Substitution Property of Equality; Subtraction Property of Equality; $m\angle DBE$; $\angle CBD \cong \angle DBE$; Transitive Property of Equality **2.** Given; definition of congruent segments; Transitive Property of Equality; definition of perimeter; $P(ABCD) = AB + AB + AB + AB$; $P(ABCD) = 4AB$

3. $\angle 5 \cong \angle 7$ **4.** $\angle 2 \cong \angle 1$ and $\angle 4 \cong \angle 3$

5. Reflexive Property of Congruence

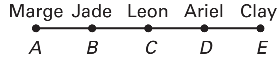
6. Symmetric Property of Congruence

7. Transitive Property of Congruence

8. $\overline{RS} \cong \overline{ST}$ and $\overline{ST} \cong \overline{TU}$ by the definition of midpoint. Then $\overline{RS} \cong \overline{TU}$ by the Transitive Property of Congruence, so $RS = RT$. Then $5x + 7 = 7x - 3$ by the Substitution Property of Equality, $10 = 2x$ by the Subtraction Property of Equality, and $5 = x$ by the Division Property of Equality.

9. Because $\overrightarrow{EG}$ bisects $\angle DEF$, $\angle DEG \cong \angle FEG$. It is given that $\angle D \cong \angle DEG$, so $\angle D \cong \angle FEG$ by the Transitive Property of Congruence. Then $m\angle D = m\angle FEG$, $4x = 2x + 30$ by the Substitution Property of Equality, $2x = 30$ by the Subtraction Property of Equality and $x = 15$ by the Division Property of Equality.

10.
1. $\overline{AE} \cong \overline{CE}$, $\overline{AB}$ and $\overline{CD}$ bisect each other (Given)
2. E is the midpoint of $\overline{AB}$ and of $\overline{CD}$. (Definition of segment bisector)
3. $\overline{EB} \cong \overline{AE}$, $\overline{CE} \cong \overline{ED}$ (Definition of midpoint)
4. $\overline{AE} \cong \overline{ED}$ (Transitive Property of Equality)
5. $\overline{EB} \cong \overline{ED}$ (Transitive Property of Equality)

11. *Sample answers:* **a.**


b.


c. Given: C is the midpoint of $\overline{AE}$, B is the midpoint of $\overline{AC}$, D is the midpoint of $\overline{CE}$
Prove: $AB = DE$ **d. 1.** C is the midpoint of $\overline{AE}$, B is the midpoint of $\overline{AC}$, D is the midpoint of $\overline{CE}$ (Given) **2.** $\overline{AC} \cong \overline{CE}$, $\overline{AB} \cong \overline{BC}$, $\overline{CD} \cong \overline{DE}$ (Definition of midpoint) **3.** $AC = CE$, $AB = BC$, $CD = DE$ (Definition of congruent segments)
4. $AC = AB + BC$, $CE = CD + DE$ (Segment Addition Postulate)
5. $AC = AB + AB$, $CE = DE + DE$ (Substitution Property of Equality)
6. $AB + AB = DE + DE$ (Substitution Property of Equality) **7.** $2AB = 2DE$ (Simplify.)
8. $AB = DE$ (Division Property of Equality)

Review for Mastery

1. $AD = 12$, $AB = 12$ (Given); $\overline{AD} \cong \overline{AB}$ (Definition of congruent segments); $\overline{BC} \cong \overline{CD}$, $\overline{AD} \cong \overline{CD}$ (Given); $\overline{CD} \cong \overline{BA}$ (Transitive Property of Segment Congruence) $\overline{BC} \cong \overline{BA}$ (Transitive Property of Segment Congruence)

2. Reflexive Property of Angle Congruence

3. Symmetric Property of Segment Congruence

4. Reflexive Property of Segment Congruence

5. Transitive Property of Angle Congruence

6. $\overline{AB} \cong \overline{BC}$, $\overline{BC} \cong \overline{CD}$, (Given); $AB = BC$ (Definition of congruent segments); $BC = CD$ (Definition of congruent segments); $AB = CD$ (Transitive Property of Equality); $\overline{AB} \cong \overline{CD}$ (Definition of congruent segments)

Challenge Practice

1. $YZ = 11$, $VZ = 27.5$ **2.** $VW = 1$, $VZ = 5$

3. The coordinate of X is 4, the coordinate of Y is 6, and the coordinate of Z is 10.

4. The coordinate of V is 12, the coordinate of X is 0, and the coordinate of Y is -6.

5. The coordinate of M is $\frac{a + b}{2}$, the coordinate of P is $\frac{3a + b}{4}$, and the coordinate of Q is $\frac{5a + 3b}{8}$.

6. $x = 10$, $y = 2$ **7.** $x = 18$, $y = 8$