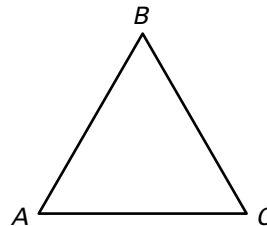


LESSON
2.6**Practice A**

For use with pages 113–120

In Exercises 1–3, complete the proof.

- 1.
- GIVEN:**
- $m\angle A = m\angle B, m\angle B = m\angle C$

PROVE: $\angle A \cong \angle C$ **Statements**

1. $m\angle A = m\angle B, m\angle B = m\angle C$

2. $m\angle A = m\angle C$

3. $\underline{\quad ? \quad}$

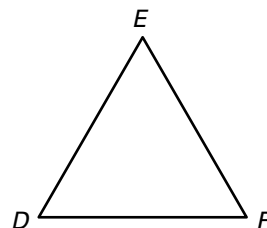
Reasons

1. Given

2. $\underline{\quad ? \quad}$

3. Definition of congruent angles

- 2.
- GIVEN:**
- $DE = EF, EF = DF$

PROVE: $\overline{DF} \cong \overline{DE}$ **Statements**

1. $DE = EF, EF = DF$

2. $\underline{\quad ? \quad}$

3. $DF = DE$

4. $\underline{\quad ? \quad}$

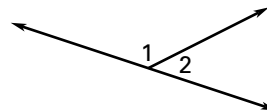
Reasons1. $\underline{\quad ? \quad}$

2. Transitive Property of Equality

3. $\underline{\quad ? \quad}$

4. Definition of congruent segments

- 3.
- GIVEN:**
- $\angle 1$
- and
- $\angle 2$
- are a linear pair.

PROVE: $m\angle 1 = 180^\circ - m\angle 2$ **Statements**

1. $\underline{\quad ? \quad}$

2. $\underline{\quad ? \quad}$

3. $m\angle 1 + m\angle 2 = 180^\circ$

4. $\underline{\quad ? \quad}$

Reasons

1. Given

2. The angles in a linear pair are supplementary angles.

3. $\underline{\quad ? \quad}$

4. Subtraction Property of Equality

LESSON 2.6 **Practice A** *continued*
For use with pages 113–120

Use the property to complete the statement.

- 4. Reflexive Property of Congruence: $\underline{\quad? \quad} \cong \angle 4$
- 5. Symmetric Property of Congruence: If $\underline{\quad? \quad} \cong \underline{\quad? \quad}$, then $\overline{CD} \cong \overline{DX}$.

In Exercises 6–9, name the property illustrated by the statement.

- 6. If $\angle 1 \cong \angle 2$ and $\angle 2 \cong \angle 4$, then $\angle 1 \cong \angle 4$.
- 7. $\overline{XY} \cong \overline{XY}$
- 8. If $\angle CDE \cong \angle RST$, then $\angle RST \cong \angle CDE$.
- 9. If $\overline{AB} \cong \overline{BC}$, then $\overline{BC} \cong \overline{AB}$.

10. Sketch a diagram that represents the following information.

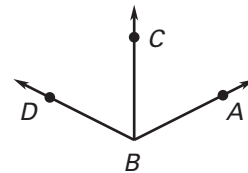
$\angle ABC$ and $\angle CBD$ are adjacent angles.

$\angle ABD$ and $\angle DBE$ are a linear pair.

11. Use the given information and the diagram to prove the statement.

GIVEN: $2 \cdot m\angle ABC = m\angle ABD$

PROVE: $\angle ABC \cong \angle CBD$



Statements	Reasons

12. **Bicycle Tour** You take part in a three day bicycle tour. On the first day, you ride 95 miles. On the third (final) day, you also ride 95 miles. Use the following steps to prove that the distance you ride in the first two days is equal to the distance that you ride in the last two days.

- a. Draw a diagram for the situation by using a line segment to represent the total distance of the three days and dividing the line segment into three parts that represent the daily distances.
- b. State what is given and what is to be proved.
- c. Write a two-column proof.

Lesson 2.5, continued

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

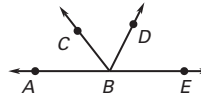
9. You are given that a is a positive integer. Assume a is even. Then $a = 2k$, where k is a positive integer. Substitute $2k$ for a in $a + 1$ to obtain $2k + 1$. Because $2k$ is even, adding 1 to this expression produces an odd number. Therefore, $a + 1$ is odd.

Lesson 2.6

Practice Level A

- Transitive Property of Equality; $\angle A \cong \angle C$
- Given; $DE = DF$; Symmetric Property of Equality; $\overline{DF} \cong \overline{DE}$
- $\angle 1$ and $\angle 2$ are a linear pair; $\angle 1$ and $\angle 2$ are supplementary; Definition of Supplementary Angles; $m\angle 1 = 180^\circ - m\angle 2$
- $\angle 4$
- \overline{DX} ; \overline{CD}
- Transitive Property of Congruence
- Reflexive Property of Congruence
- Symmetric Property of Congruence
- Symmetric Property of Congruence

10. Sample sketch:



- $2m\angle ABC = m\angle ABD$ (Given)
- $m\angle ABC + m\angle CBD = m\angle ABD$ (Angle Addition Postulate)
- $2m\angle ABC = m\angle ABC + m\angle CBD$ (Transitive Property of Equality)
- $m\angle ABC = m\angle CBD$ (Subtraction Property of Equality)
- $\angle ABC \cong \angle CBD$ (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.** Given **2.** Given **3.** Substitution Property of Equality **4.** $\overline{HI} \cong \overline{IJ}$ **5.** Given **6.** Transitive Property of Congruence
- 1.** Given **2.** Given **3.** Definition of complementary angles **4.** Transitive Property of Equality **5.** Subtraction Property of Equality **6.** Definition of congruent angles
- 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
- 1.** Given **2.** Transitive Property of Angle Congruence **3.** $m\angle 2 = m\angle 4$ **4.** Substitution Property of Equality
- $x = 6$; 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 .
- $x = 3$; By the transitive property, $\overline{FG} \cong \overline{JH}$. Set the lengths of the segments equal to each other to find x .
- $x = 5$; 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 .