

LESSON
2.5**Study Guide**

For use with pages 104–111

GOAL Use algebraic properties in logical arguments.**Vocabulary****Algebraic Properties of Equality**Let a , b , and c be real numbers.**Addition Property** If $a = b$, then $a + c = b + c$.**Subtraction Property** If $a = b$, then $a - c = b - c$.**Multiplication Property** If $a = b$, then $ac = bc$.**Division Property** If $a = b$ and $c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$.**Substitution Property** If $a = b$, then a can be substituted for b in any equation or expression.**Distributive Property** $a(b + c) = ab + ac$, where a , b , and c are real numbers.**Reflexive Property of Equality****Real Numbers** For any real number a , $a = a$.**Segment Length** For any segment \overline{AB} , $AB = AB$.**Angle Measure** For any angle $\angle A$, $m\angle A = m\angle A$.**Symmetric Property of Equality****Real Numbers** For any real numbers a and b , if $a = b$, then $b = a$.**Segment Length** For any segments \overline{AB} and \overline{CD} , if $AB = CD$, then $CD = AB$.**Angle Measure** For any angles $\angle A$ and $\angle B$, if $m\angle A = m\angle B$, then $m\angle B = m\angle A$.**Transitive Property of Equality****Real Numbers** For any real numbers a , b , and c , if $a = b$ and $b = c$, then $a = c$.**Segment Length** For any segments \overline{AB} , \overline{CD} , and \overline{EF} , if $AB = CD$ and $CD = EF$, then $AB = EF$.**Angle Measure** For any angles $\angle A$, $\angle B$, and $\angle C$, if $m\angle A = m\angle B$ and $m\angle B = m\angle C$, then $m\angle A = m\angle C$.

LESSON
2.5**Study Guide** *continued*
For use with pages 104–111**EXAMPLE 1** Write reasons for each step**Solve $3(x - 2) = x + 4$. Write a reason for each step.**

Equation	Explanation	Reason
$3(x - 2) = x + 4$	Write original equation.	Given
$3x - 6 = x + 4$	Multiply.	Distributive Property
$3x - 6 - x = x + 4 - x$	Subtract x from each side.	Subtraction Property of Equality
$2x - 6 = 4$	Combine like terms.	Simplify.
$2x = 10$	Add 6 to each side.	Addition Property of Equality
$x = 5$	Divide each side by 2.	Division Property of Equality

The value of x is 5.**Exercises for Example 1****Solve the equation. Write a reason for each step.**

1. $2x + 10 = 7x$

2. $4 - (3x + 5) = 11 - x$

EXAMPLE 2 Use properties of equalityIn the diagram, $WY = XZ$.
Show that $WX = YZ$.

Equation	Explanation	Reason
$WY = WX + XY$	Add lengths of adjacent segments.	Segment Addition Postulate
$XZ = XY + YZ$	Add lengths of adjacent segments.	Segment Addition Postulate
$WY = XZ$	Use given information.	Given
$WX + XY = XY + YZ$	Substitute $WX + XY$ for WY and $XY + YZ$ for XZ .	Substitution Property of Equality
$WX = YZ$	Subtract XY from each side.	Subtraction Property of Equality

Exercises for Example 2**Name the property of equality the statement illustrates.**

3. If $WX = YZ$, then $YZ = WX$.

4. If $m\angle D = m\angle E$ and $m\angle E = 45^\circ$, then $m\angle D = 45^\circ$.