2.5 Reason Using Properties from Algebra

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 AB, $AB = AB$.
Angle Measure	For any 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 AB and CD, if $AB = CD$, then $CD = AB$.
Angle Measure	For any angles A and 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 AB, CD, and EF, if $AB = CD$ and $CD = EF$, then $AB = EF$.
Angle Measure	For any angles A, B, and C, if $m\angle A = m\angle B$ and $m\angle B = m\angle C$, then $m\angle A = m\angle C$.