Algebraic Properties of Equality

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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 $a = b$, then $a \div c = b \div c$
Substitution Property	If $a = b$, then a can be substituted for b in any equation or expression

Reflexive, Symmetric, Transitive Properties of Equality

Reflexive Property

Things are equal to themselves.
For any real number a, $a = a$.
For any segment $\overline{AB}$, $\overline{AB} \cong \overline{AB}$ and AB = AB
For any angle $\angle A$, $\angle A \cong \angle A$ and $m\angle A = m\angle A$

Symmetric Property

Equality goes both ways.
For any real numbers a & b, if $a = b$, then $b = a$.
For any segments $\overline{AB}$ and $\overline{CD}$, if $AB = CD$, then $CD = AB$
For any angles $\angle A$ and $\angle B$, if $m\angle A = m\angle B$, then $m\angle B = m\angle A$

Transitive Property

Two things both equal to a third thing are themselves equal.
For any real numbers a, b, and c, if $a = b$ and $b = c$, then $a = c$.
For any segments $\overline{AB}$, $\overline{CD}$ and $\overline{EF}$, if $AB = CD$ and $CD = EF$, then $AB = EF$.
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 $m\angle A = m\angle C$

Other Properties of Equality

Distributive Property of Equality For any real numbers a, b, and c, $a(b + c) = ab + bc$