

Algebraic Properties of Equality

1. Addition Property of Equality – If _____, then _____

Example: $x - 7 = 10$
 $x = 17$

By adding 7 to each side.

2. Subtraction Property of Equality – If _____, then _____

Example: $x + 3 = 8$
 $x = 5$

By subtracting each side by 3.

3. Multiplication Property of Equality – If _____, then _____

Example: $\frac{1}{2}x = 9$
 $x = 18$

By multiplying each side by 2.

4. Division Property of Equality – If _____, then _____

Example: $4x = 24$
 $x = 6$

By dividing each side by 4.

5. Substitution Property of Equality – If _____, then _____

Example: If $x = 9$, we can rewrite $7x - 5 = 58$ as:
 $7(9) - 5 = 58$

6. Distributive Property –

Example: $6(x + 3) = 6x + 18$

More Properties of Equality

	For Numbers	For Segments	For Angles
Reflexive Property of Equality			
Symmetric Property of Equality			
Transitive Property of Equality			

Other Rules

1. Label one column "Equation" or "Statement" and the other column "Reason".
2. Number each line of the proof.
3. Start proof by rewriting original equation or statement and give the reason "given".
4. If collecting like terms, the reason is "simplifying".
5. To rewrite equation so that the variable is on the left, the reason is "symmetric"

Partner Practice: Solve the equation using a two column proof.

1. Given: $5x + 11 = 39 - 2x$
Prove: $x = 4$

2. Given: $2(6x - 7) - 8x = -10$
Prove: $x = 1$

3. Given: $13 = \frac{1}{3}x + 8$
Prove: $x = 15$