

ALGEBRAIC PROPERTIES OF EQUALITY

If a , then $a = a$	If C , then $C = C$	Reflexive Property of Equality
If $a = b$, then $b = a$	If $KN = BR$, then $BR = KN$	Symmetric Property of Equality
If $a = b$ and $b = c$, then $a = c$	If $x = 2$ and $y = 2$, then $x = y$	Transitive Property of Equality
If $a = b$, then $a + c = b + c$	If $9x - 8 = 19$, then $9x = 27$	Addition Property of Equality
If $a = b$, then $a - c = b - c$	If $2x + 5 = 12$, then $2x = 7$	Subtraction Property of Equality
If $a = b$, then $ac = bc$	If $\frac{x}{3} = 2$, then $x = 6$	Multiplication Property of Equality
If $a = b$, then $\frac{a}{c} = \frac{b}{c}$	If $7x = 35$, then $x = 5$	Division Property of Equality
If $a = b$, then you may replace b with a in any expression	If $3x + y = 8$ and $y = 2$, then $3x + 2 = 8$	Substitution Property of Equality
$a(b+c) = ab + ac$ $a(b-c) = ab - ac$	If $2(y+2) = 22$, then $2y + 4 = 22$	Distributive Property

$$\text{If } 9x - 8 = 19, \\ \text{then } 9x = 27$$

$$\text{If } 7x = 35, \\ \text{then } x = 5$$

$$\text{If } KN = BR, \\ \text{then } BR = KN$$

$$\text{If } x = 2 \text{ and } y = 2, \\ \text{then } x = y$$

$$\text{If } 2(y+2) = 22, \\ \text{then } 2y + 4 = 22$$

$$\text{If } 3x + y = 8 \text{ and } \\ y = 2, \text{ then } 3x + 2 = 8$$

$$\text{If } C, \text{ then } \\ C = C$$

$$\text{If } 2x + 5 = 12, \\ \text{then } 2x = 7$$

$$\text{If } \frac{x}{3} = 2, \text{ then } \\ x = 6$$

1. Complete the following table with the properties used to solve $4(x + 3) = 20$.

Statements	Proof
$4(x + 3) = 20$	Given
$4x + 12 = 20$	Distributive Property
$4x = 8$	Subtraction Property
$x = 2$	Division Property

2. Complete the following table with the mathematical statements that correspond to the proofs used to solve $\frac{4(x-3)}{3} = 20$.

Statements	Proof
$\frac{4(x-3)}{3} = 20$	Given
$4(x-3) = 60$	Multiplication Property of Equality
$4x - 12 = 60$	Distributive Property
$4x = 72$	Addition Property of Equality
$x = 18$	Division Property of Equality



3. Fill in the two-column algebra proof.

Given: $5y + 4 = 2(y + 3) + 1$

Prove: $x = 1$

Statements	Reasons
$5y + 4 = 2(y + 3) + 1$	Given
A. $5y + 4 = 2y + 6 + 1$	Distributive Property
B. $5y + 4 = 2y + 7$	F. Simplify/Combine Like terms
C. $3y + 4 = 7$	G. Subtraction Property
D. $3y = 3$	H. Subtraction Property
E. $y = 1$	I. Division Property

