

PROPERTIES OF EQUALITY

Reference

Property	Meaning
Addition Property	If _____, then _____.
Subtraction Property	If _____, then _____.
Multiplication Property	If _____, then _____.
Division Property	If _____, then _____.
Distributive Property	$a(b + c)$, then $a(b + c) =$ _____.
Substitution Property	If _____ then a may be _____ by b in any expression or equation.
Reflexive Property	For any real number a , _____. (A value always will equal itself!)
Symmetric Property	If _____, then _____.
Transitive Property	If _____, and _____, then _____.

Name that property! Write the name of the property that justifies each statement.

1. If $k = 3$, then $3 = k$	1.
2. If $2x = 14$, then $x = 7$	2.
3. $10y = 10y$	3.
4. If $-5x - 1 = -11$, then $-5x = -10$	4.
5. If $10a = 2b$ and $2b = c$, then $10a = c$	5.
6. $-7(n - 4) = -7n + 28$	6.
7. If $6y = 24$, then $6y - 3 = 24 - 3$	7.
8. If $10x + w = 41$ and $w = 1$, then $10x + 1 = 41$	8.
9. If $3x = 2y$ and $2y = z$, then $3x = z$	9.
10. If $7m = 35$, then $7m + 4 = 35 + 4$	10.
11. If $-2c = 18$, then $18 = -2c$	11.
12. Given $3x^2 + 1$, if $x = 5$, then $3(5)^2 + 1$	12.
13. If $m = -2$, then $8m = -16$	13.
14. $5x + 8x = x(5 + 8)$	14.

What is a
**TWO-COLUMN
PROOF?**

- The two-column proof is a common format used to organize a proof:
 - The _____ (or steps) are listed on the **LEFT SIDE**.
 - The _____ justifying each statement are listed on the **RIGHT SIDE**.
- What can be used as reasons? _____, _____, _____, _____

Use the properties of equality to complete each proof.

1 Given: $4x - 1 = 27$; Prove: $x = 7$

Statements	Reasons
1. $4x - 1 = 27$	1. Given
2. $4x = 28$	2.
3. $x = 7$	3.

2 Given: $\frac{a}{-6} + 2 = 5$; Prove: $a = -18$

Statements	Reasons
1. $\frac{a}{-6} + 2 = 5$	1. Given
2. $\frac{a}{-6} = 3$	2.
3. $a = -18$	3.

3 Given: $-9(2x - 3) = 63$; Prove: $x = -2$

Statements	Reasons
1. $-9(2x - 3) = 63$	1. Given
2. $-18x + 27 = 63$	2.
3. $-18x = 36$	3.
4. $x = -2$	4.

4 Given: $6x + 7 = 8x - 17$; Prove: $x = 12$

Statements	Reasons
1. $6x + 7 = 8x - 17$	1. Given
2. $7 = 2x - 17$	2.
3. $24 = 2x$	3.
4. $12 = x$	4.
5. $x = 12$	5.

5 Given: $-7(x + 2) + 4x = 6(2x - 4)$; Prove: $x = 2/3$

Statements	Reasons
1. $-7(x + 2) + 4x = 6(2x - 4)$	1. Given
2. $-7x - 14 + 4x = 12x - 24$	2.
3. $-3x - 14 = 12x - 24$	3.
4. $-15x - 14 = -24$	4.
5. $-15x = -10$	5.
6. $x = 2/3$	6.

6 Given: $3x + 1 = -14$; Prove: $x = -5$

Statements	Reasons

7 Given: $2(x - 9) = -10$; Prove: $x = 4$

Statements	Reasons

8 Given: $\frac{5y-1}{2} = 7$; Prove: $y = 3$

Statements	Reasons

9 Given: $10k - 4 = 2k - 20$; Prove: $k = -2$

Statements	Reasons

10 Given: $-8(w + 1) = -5(w + 10)$; Prove: $w = 14$

Statements	Reasons

11 Given: $14 - 2(x + 8) = 5x - (3x - 34)$; Prove: $x = -9$

Statements	Reasons