

Using the Properties of Equality

Properties of equality can be used to justify steps in solving an equation.



Two-Column Proof: A common format used to organize a proof.

Left Side: List the statements (or steps).

Right Side: List the reasons that justify each step.

What can be used as reasons?

properties, postulates, theorems, definitions

1	Given: $4x - 1 = 27$; Prove: $x = 7$	
1.	$4x - 1 = 27$ <small style="margin-left: 20px;">+1 +1</small>	1. Given
2.	$4x = 28$	2. Addition Property
3.	$x = 7$	3. Division Property

2	Given: $\frac{a}{-6} + 2 = 5$; Prove: $a = -18$	
1.	$\frac{a}{-6} + 2 = 5$	1. Given
2.	$\frac{a}{-6} = 3$	2. Subtraction Property
3.	$a = -18$	3. Multiplication Property

3	Given: $-9(2x - 3) = 63$; Prove: $x = -2$	
1.	$-9(2x - 3) = 63$	1. Given
2.	$-18x + 27 = 63$	2. Distributive Property
3.	$-18x = 36$	3. Subtraction Property
4.	$x = -2$	4. Division Property

Given: $6x + 7 = 8x - 17$; Prove: $x = 12$	
1. $6x + 7 = 8x - 17$ <small>$-6x$ $-6x$</small>	1. Given
2. $7 = 2x - 17$	2. Subtraction Property
3. $24 = 2x$	3. Addition Prop.
4. $12 = x$	4. Division Property
5. $x = 12$	5. Symmetric prop.

Given: $-7(x + 2) + 4x = 6(2x - 4)$; Prove: $x = 2/3$	
1. $-7(x + 2) + 4x = 6(2x - 4)$	1. Given
2. $-7x - 14 + 4x = 12x - 24$	2. Distributive Prop.
3. $-3x - 14 = 12x - 24$ <small>$+3x$ $+3x$</small>	3. Combine like terms/simplify
4. $-14 = 15x - 24$	4. Addition Prop.
5. $10 = 15x$ <small>$+24$ $+24$</small>	5. Addition Prop.
6. $\frac{10}{15} = \frac{15x}{15}$ $\frac{2}{3} = x$	6. Division Prop.
$x = \frac{2}{3}$	Symmetric