

# Properties of Equality

The steps to solve an equation are justified by properties of equality. They ensure that the equations stays balanced in order to solve for the missing variable.

- Addition Property of Equality
- Subtraction Property of Equality
- Multiplication Property of Equality
- Division Property of Equality
- Distributive Property

Directions: Identify which property justifies each step used to solve the equations below.

1	Equation Steps	Properties/Reasons
1.	$2(x - 9) = -10$	1. Given
2.	$2x - 18 = -10$	2. Distributive Prop.
3.	$2x = 8$	3. Addition Prop. of Eq.
4.	$x = 4$	4. Division Prop. of Eq.

2	Equation Steps	Properties/Reasons
1.	$\frac{m}{-3} + 10 = -1$	1. Given
2.	$\frac{m}{-3} = -11$	2. Subtraction Prop. of Eq.
3.	$m = 33$	3. Multiplication Prop. of Eq.

3	Equation Steps	Properties/Reasons
1.	$\frac{5y - 1}{2} = 7$	1. Given
2.	$5y - 1 = 14$	2. Multiplication Prop. of Eq.
3.	$5y = 15$	3. Addition Prop. of Eq.
4.	$y = 3$	4. Division Prop. of Eq.

4	Equation Steps	Properties/Reasons
	1. $10k - 4 = 2k - 20$	1. Given
	2. $8k - 4 = -20$	2. Subtraction Prop. of Eq.
	3. $8k = -16$	3. Addition Prop. of Eq.
	4. $k = -2$	4. Division Prop. of Eq.

5	Equation Steps	Properties/Reasons
	1. $5n - 42 = 12n$	1. Given
	2. $-42 = 7n$	2. Subtraction Prop. of Eq.
	3. $-6 = n$	3. Division Prop. of Eq.
	4. $n = -6$	4. Symmetric Prop.

6	Equation Steps	Properties/Reasons
	1. $-8(w + 1) = -5(w + 10)$	1. Given
	2. $-8w - 8 = -5w - 50$	2. Distributive Prop.
	3. $-3w - 8 = -50$	3. Addition Prop. of Eq.
	4. $-3w = -42$	4. Addition Prop. of Eq.
	5. $w = 14$	5. Division Prop. of Eq.

7	Equation Steps	Properties/Reasons
	1. $14 - 2(x + 8) = 5x - (3x - 34)$	1. Given
	2. $14 - 2x - 16 = 5x - 3x + 34$	2. Distributive Prop.
	3. $-2x - 2 = 2x + 34$	3. Combine Like Terms
	4. $-4x - 2 = 34$	4. Subtraction Prop. of Eq.
	5. $-4x = 36$	5. Addition Prop. of Eq.
	6. $x = -9$	6. Division Prop. of Eq.