Solving Equations Using Addition or Subtraction

Inverse operations are two operations that undo each other, such as addition and subtraction. When you perform the same inverse operation on each side of an equation, you obtain an equivalent equation.

Equivalent equations have the same solution.

Subtraction Property of Equality

Words: Subtracting the same number from each side of an equation produces an equivalent equation.

Numbers: If $x + 3 = 5$, then $x + 3 - 3 = 5 - 3$, or $x = 2$.

Algebra: If $x + a = b$, then $x + a - a = b - a$, or $x = b - a$.

Example 1: **Solve $x + 9 = {}^-3$. Then check if the solution is accepted**

$x + 9 = {}^-3$	Write original equation.
$x + 9 - 9 = {}^-3 - 9$	Subtract 9 from each side.
$x = {}^-12$	Simplify.

The solution is $^-12$.

Check:
$x + 9 = {}^-3$	Write original equation.
$^-12 + 9 = {}^-3$	Substitute $^-12$ for x.
$^-3 = {}^-3$	Solution checks.

Addition Property: Just as u can use the subtraction property of equality to solve an equation involving addition, you can use the addition property of equality to solve an equation involving subtraction.

Addition Property of Equality

Words: Adding the same number to each side of an equation produces an equivalent equation.

Numbers: If $x - 3 = 5$, then $x - 3 + 3 = 5 + 3$, or $x = 8$.

Algebra: If $x - a = b$, then $x - a + a = b + a$, or $x = b + a$.

The weight of the horse is 1225 pounds.