Objectives

- Solve equations using both properties of equality.
- Learn how to clear the equations of fractions or decimals.

Whenever we solve equations, we use the Addition and Multiplication Properties of Equality along with the Order of Operations and Properties of Real Numbers to derive equivalent equations until we get a solution equation like

$$x = a\ number$$

We use the Addition Property of Equality before we use the Multiplication Property when solving equations.

Example 1   Solve: $4x + 2 = 14$ Check your solution.

$4x + 2 + (^-2) = 14 + (^-2)$	Addition Property
$4x + 0 = 12$	Additive Inverse Prop, *i.e.*, $a + (^-a) = 0$
$4x = 12$	Additive Identity Prop, *i.e.*, $a + 0 = a$
$\dfrac{4x}{4} = \dfrac{12}{4}$	Multiplication Property
$1 \cdot x = 3$	Divide

Check

$4x + 2 = 14$	given equation
$4 \cdot 3 + 2 = 14$	replace x with 3
$12 + 2 = 14$	use the Order of Operations
$14 = 14$	solution checks

Exercises

1.   Solve the equation. Check your solutions!

a) $5x + 3 = 58$ b) $6x - 5 = 2$ c) $5x - 8 = 42$ d) $9 - t = 21$

e) $32 - 7x = 11$ f) $6 + \dfrac{5}{4}x = {}^-4$ g) $-2x + 7x = 45$ h) $8x = 3x + 4$

i) $6x - 5 = 7 + 2x$ j) $5y + 3 = 2y + 15$ k) $2(3t + 1) - 5 = t - (t + 2)$

2.   Clear fractions or decimals, solve and check.

a) $\dfrac{3}{4} + \dfrac{1}{3}x = 5$ b) $-\dfrac{3}{4}x - \dfrac{5}{2} = -\dfrac{5}{8} + 2x$

c) $0.6y - 0.3 = 0.7 - 0.3y$ d) $0.75x + 16.2 = 2.4 - 5x$

3.   Solve and check. Label any contradictions or identities.

a) $5 + 5x = 2(x - 4) + 3x$ b) $3(t + 2) + t = 2(3 + 2t)$

c) $2(7 - x) - 20 = 7x - 3(2 + 3x)$ d) $4x - 3 = {}^-2(3 - 2x)$

Answers: 1a) 11, b) $\dfrac{7}{6}$, c) 10, d) 12, e) 3, f) $^-8$, g) 9, h) $\dfrac{4}{5}$, i) 3, j) 4, k) $\dfrac{1}{6}$, 2a) $\dfrac{51}{4}$, b) $-\dfrac{15}{22}$, c) $\dfrac{10}{9}$,

d) $^-2.4$, 3a) No Solution; Contradiction, b) All Real Numbers; Identity, c) All Real Numbers; Identity,
d) No Solution; Contradiction