

Section 2.1: The Addition Principle

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1:02 PM

of Equality

An equation uses an equal sign ($=$) and indicates that two expressions are equal.

$$5 = 3 + 2 \quad \leftarrow \text{always true}$$

$$x + 3 = 7 \quad \leftarrow \text{only true when } x = 4$$

The solution of an equation is the number or numbers that the variable can have that make the equation true - a listing of all possible values.

example: Is 5 a solution of the equation

$$-10 + 4 = x - 2 \quad ?$$

if we substitute $x = 5$ into the equation

$$-10 + 4 \stackrel{?}{=} 5 - 2$$

$$-6 \stackrel{?}{=} 3 \quad \text{FALSE!}$$

NO, 5 is not a solution.

The Addition Principle: adding the same number to both sides of an equation does not change the solution set

example: $x - 4^{+4} = 12 + 4$

$$x = 16$$

examples: Solve each equation using the addition principle.

a) $m - 6.2^{+6.2} = -3.5^{+6.2}$

$$m = 2.7$$
$$\begin{array}{r} 6.2 \\ - 3.5 \\ \hline \end{array}$$

b) $6x - 7^{+7} = 5x - 8^{+7}$

$$6x^{+(-5x)} = 5x - 1^{+(-5x)}$$
$$x = -1$$

remember that subtracting a number is the same as adding its opposite

c) $2(2x+4) = 7 + 3x$

$$4x + 8 = 7 + 3x$$

short method

$$4x + 8 = 7 + 3x$$

$$4x - 3x = 7 - 8$$

longer method

$$4x + 8 - 3x = 7 + 3x - 3x$$

$$x + 8 - 8 = 7 - 8$$

$$4x - 3x = 7 - 8$$

$$x = -1$$

$$x + 8 - 8 = 7 - 8$$

$$x = -1$$

$$d) \quad 2x - 8 = 3x - 15$$

$$-8 + 15 = 3x - 2x$$

$$7 = x$$

$$x = 7$$

$$2x - 8 - 2x = 3x - 15 - 2x$$

$$+15 - 8 = x - 15 + 15$$

$$7 = x$$

$$x = 7$$