

Pre-Algebra
Skill Builder #LE - 1
Solving One-Step Linear Equations (Addition/Subtraction)

Note that an equation has the following structure:

$$\boxed{\text{left expression} = \text{right expression}}$$

We will sometimes use the abbreviations **LHS** and **RHS** to denote the left-hand side and the right-hand side of an equation, respectively. **Each problem will always have two expressions separated by the equal sign.** It is **IMPORTANT** to write the **EQUAL SIGN** between the LHS and the RHS.

If we manipulate expressions, what then do we do with equations? The answer is we **solve equations**, or try to. Initially we confine ourselves to studying **equations in one variable**.

Solving an equation simply means ***finding the value of the variable that will make the equation a true statement***. Going back to the example, solving the equation $x + 3 = 5$ means finding the value of x that will satisfy the equation. Of course it is easy to see that the value of 2 for x will make the equation true. We call 2 the **solution** of the equation.

In the following two examples determine if the given value is a solution of the equation:

1) $2x - 14 = 12; 9$
 $2 \cdot 9 - 14 = 12$
 $18 - 14 = 12$
 $4 = 12$ **No**

2) $x^2 + 5x - 2 = 22; 3$
 $3^2 + 5 \cdot 3 - 2 = 22$
 $9 + 15 - 2 = 22$
 $22 = 22$ **Yes**

Now we use the addition property: $a = b \Leftrightarrow a + c = b + c$

Method: use this property to isolate the variable on one side of the equation.
In the following two examples use this property to solve the equation.

3) $x - 12 = 18$
 $x - 12 + 12 = 18 + 12$
 $x = 30$

4) $19 = 10 + z$
 $19 - 10 = 10 + z - 10$
 $9 = z$

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For problems 1 & 2 see if the value is a solution of the equation and for 3 through 8 solve the equation.

1) $9x + 11 = 21; 1$

2) $4x - 5 = 7; 3$

3) $a + 14 = 11$

4) $20 = z - 16$

5) $-10 = k - 32$

6) $17 + b = -20$

7) $-27 + x = -30$

8) $-20 + c - 40 = -70 + 3$
(a little more difficult)

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Answer Key:

1) No

2) Yes

3) $a=-3$

4) $z=36$

5) $k=22$

6) $b=-37$

7) $x=-3$

8) $c=-7$