About variables.

When we need to write the mathematical expression, but we don't know exact numbers to be used, we use variables. It can be any symbol, but it's very convenient to use letters. For example, if the number of the books on one shelf is n and the number of the book on the other shelf is m, the total number of books on both shelves is $n + m$. We can perform all the usual arithmetic operations with the variables, but the exact answer can be reached only when the values are assigned to the variables.

Equation.

Equation is an equality with one or more variables. For example.

$$1 + x = 15$$
$$x + y + z = 100$$

To solve an equation means to find such value of the variable(s) that the equation will become a true equality. In the first equation above, if the value of x is 14, the right side of the equality is equal to the left side:

$1 + 14 = 15$.

Equations are very useful to solve word problems. In each word problem there is an unknown quantity, and known parameters out of which the equation can be created. For example, let's take a look on the following problem:

There are 27 pencils in two boxes altogether. There are 5 more pencils In one box then in the other. How many pencils are there in each box?

There are two unknown quantities in this problem, the number of pencils in the first box and the number of pencils in the second box. But these two quantities are not independent, one is 5 less than the other. If the number of pencils in one box is denoted as x, number of pencils in the second box will be $x + 5$. And we also know that the total number is 27.

$$x + x + 5 = 27$$
$$2x = 27 - 5 = 22$$
$$x = 22 : 2 = 11$$

Answer: there are 11 pencils in one box, and 16 in the other.

Exercises:

1. Write an expression to solve the problems;
   a. There are a pencils in 4 identical boxes. How many pencils in 15 such boxes?
   b. One box contains a pencils, and the other has 4 times fewer pencils than the first. How many more pencils are in the first box than in the second?

2. Solve the following equations:

   a. $2x + 3 = 11$;

   b. $\dfrac{1}{2}x - 5 = 12$;

   c. $14 + x = 4 + 6x$

   d. $7x - 1 = 25$;

   e. $3.5x = 10.5$;

   f. $3x - 4 = -3$

3. The sum of three consecutive numbers is 135. What is the smallest of the three numbers?