

## Variables

When we need to write a mathematical expression, but we don't know the exact numbers to use, we use variables. It can be any symbol, for example ☆ or 😊, but it is very convenient to use letters. For example, if the number of books on the first shelf is  $n$  and the number of books on the second shelf is  $m$ , the total number of books on both shelves is  $n + m$ .

We can do all the usual arithmetic operations on variables, but the exact answer can only be obtained when values are passed into variables.

Let's have a look at expressions for the following problems:

- 3 packages of cookies cost  $a$  dollars. How much do 5 such packages cost?

If 3 packages of cookies cost  $a$  dollars, one pack costs

$$1 \text{ pack} = \frac{a}{3} = a:3$$

Five such packs will be

$$5 \cdot a:3 = \frac{5a}{3} = \frac{5}{3}a$$

- 5 bottles of juice cost  $b$  dollars. How many bottles can one buy with  $c$  dollars?

Similarly to the problem above, if 5 bottles cost  $b$  dollars, one bottle will cost

$$\frac{b}{5} \text{ dollars}$$

If I have only  $c$  dollars, I can buy the number of bottles equal to my total money divided by the price of one bottle:

$$c:\frac{b}{5} = c \cdot \frac{5}{b} = \frac{5c}{b}$$

If I have only \$30 and 5 bottles cost 10 dollars I can buy:

$$30:\frac{10}{5} = 30 \cdot \frac{5}{10} = 30 \cdot \frac{1}{2} = 15 \text{ bottle}$$

## Homework.

- There are  $a$  pencils in 4 identical boxes.
  - How many pencils are in 1 such box?
  - How many pencils are in 15 such boxes?
- Julia had 20 cards. She gave  $a$  cards to her sister. How many cards does she have now? Can  $a$  be any number?
- Alex is  $m$  years old. Robert is  $n$  years older than Alex.
  - How old will each of the boys be in 3 years?
  - How many times Robert will be older than Alex in 3 years?
  - Solve the problem if  $m = 2, n = 10$ .
- Compute:

$$3 + (-2) =$$

$$3 + (2) =$$

$$-3 - (-2) =$$

$$3 - (2) =$$

$$-3 + (-2) =$$

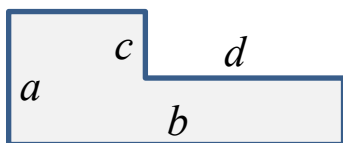
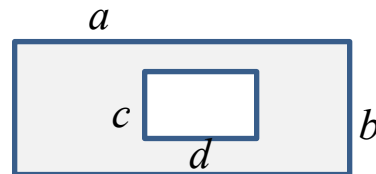
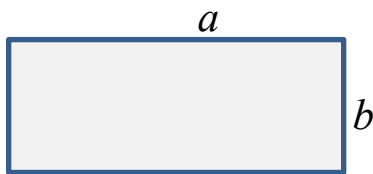
$$-3 + (2) =$$

$$3 - (-2) =$$

$$-3 - (2) =$$

$$-3 + (3) =$$

- Write the expressions for the shaded areas below (all angles are right angles):



6. Fill the empty spaces in the table:

$c$	$b$	$b \cdot c$
$\frac{3}{8}$	$\frac{3}{4}$	
$\frac{3}{4}$		$\frac{9}{21}$
	$\frac{2}{3}$	$\frac{16}{21}$

7. Each floor of a residential building has  $f$  two-bedroom apartments and  $g$  three-bedroom apartments. The building has 5 floors. How many apartments are there in the building?

8. Write the coordinate of the points on the picture:

Example:  $A_1(5,11)$

