

Math 4b.



## Equations and word problems

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

***Problem:** There are 27 pencils in two boxes altogether. There are 5 more pencils in one box than 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.

## Homework

1. Write the following as mathematical expression. If this expression is an equation, solve it.

a) Sum of the number  $x$  and 15 equals to 20.

b) Product of  $y$  and 10.

c) Difference between  $z$  and 4 is equal to 12.

2. Solve the equations and check your solution:

1)  $m - 49 = 34 + 7$       2)  $x \cdot 70 = 50785 - 1785$       3)  $36 - b = 70 - 62$

3. John has 12 more oranges than Ana. If they have 28 oranges together, find the number of oranges John has.

4. Mike and Julia together have 19 mangoes. If Mike has 3 mangoes less than Julia, find the number of mangoes Julia has.

5. 10 identical notebooks cost  $x$  dollars. Textbook costs 15 dollars more than notebook.

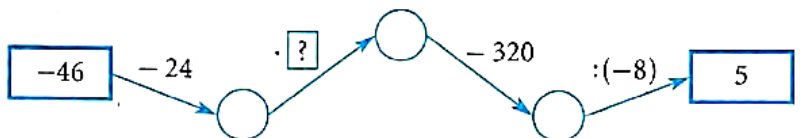
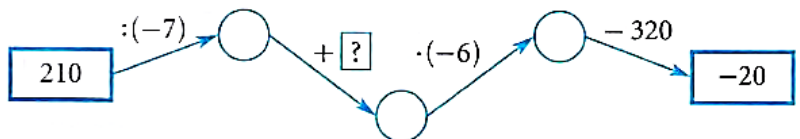
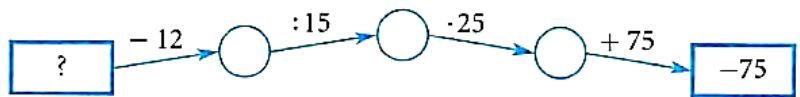
a. What is the price of one notebook?

b. What is the price of the textbook?

c. What is the price of  $n$  notebooks?

d. What is the price of  $n$  notebooks and  $m$  textbooks?

6. What number should be placed instead of “?” ?



7. A store is giving rewards to its customers at the register. Every 15th receives a free lollipop, every 24th receives a free chocolate bar. During that day 1000 customers visited the store. How many of them have received:

- a) a free lollipop?
- b) a free chocolate bar?
- c) both?