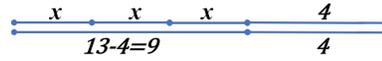
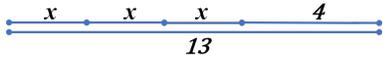


Example 2

Let's have a look at $3x + 4 = 13$

The process of the solving this equation can be visualized as following:



$$3x + 4 = 13$$

$$3x = 13 - 4 = 9$$

$$x = 9 : 3 = 3$$

Check:

$$3 \cdot 3 + 4 \quad ? \quad 13$$

$$9 + 4 \quad ? \quad 13$$

$$13 = 13$$

Example 3

Let's have a look at the equation that has variable on both sides $2x + 3 = 33 - x$:

$$2x + 3 = 33 - x$$

$$2x + 3 + x = 33 - x + x \quad (\text{Add } x \text{ to both sides})$$

$$3x + 3 = 33$$

$$3x + 3 - 3 = 33 - 3 \quad (\text{Subtract 3 from both sides})$$

$$3x = 30$$

$$3x : 3 = 30 : 3 \quad (\text{Divide both sides by 3})$$

$$x = 10$$

Check:

$$2 \cdot 10 + 3 \quad ? \quad 33 - 10$$

$$20 + 3 \quad ? \quad 23$$

$$23 = 23$$

Equations and word problems

Problem 1: *There are candies in a box. If each kid will take 4 candies, 19 candies will be left in the box. If each kid will take 5 candies, there will be lacking 2 candies. How many candies are there in the box?*

In this problem there are two unknown quantities, the number of kids, and number of candies in the box. If the number of kids is denoted as x , the number of candies can be calculated in two ways:

First, $5 \cdot x - 2 =$ number of candies in the box

Second, $4 \cdot x + 19 =$ number of candies in the box, so

$$5 \cdot x - 2 = 4 \cdot x + 19$$

$$5x - 4x = 19 + 2$$

$$x = 21$$

The number of kids is 21. The number of candies can be calculated from either expression:

$$5 \cdot 21 - 2 = 4 \cdot 21 + 19 = 103$$

Answer: there are 103 candies in the box.

Homework

1. State how the first equation can be converted to the second and the second to the third:

Example: $4x + 2 = 10$
 $4x = 8$
 $x = 2$

Solution: $4x + 2 = 10$
 $4x = 8$
 $x = 2$

(Red arrows indicate: -2 from the first equation to the second, and $:4$ from the second to the third.)

a) $8x + 3 = 5 + x$
 $7x + 3 = 5$
 $7x = 2$

b) $3x - 4 = 24 - 3x$
 $6x - 4 = 24$
 $6x = 28$

c) $5(2x - 5) = 20$
 $2x - 5 = 4$
 $2x = 9$

2. Solve equations:

a) $3x - 13 = 26$

c) $x + 3 = 23 - 3x$

d) $4x = 21 + 3x$

e) $5(x + 1) = 10$

f) $2k - 2 = 7 - k$

g) $5x - 4 = 2x + 17$

3. Find where the pattern is broken:

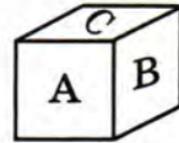
a) 35, 32, 29, 27, 24, 21, 18

b) 0, 12, 24, 36, 46, 58, 70

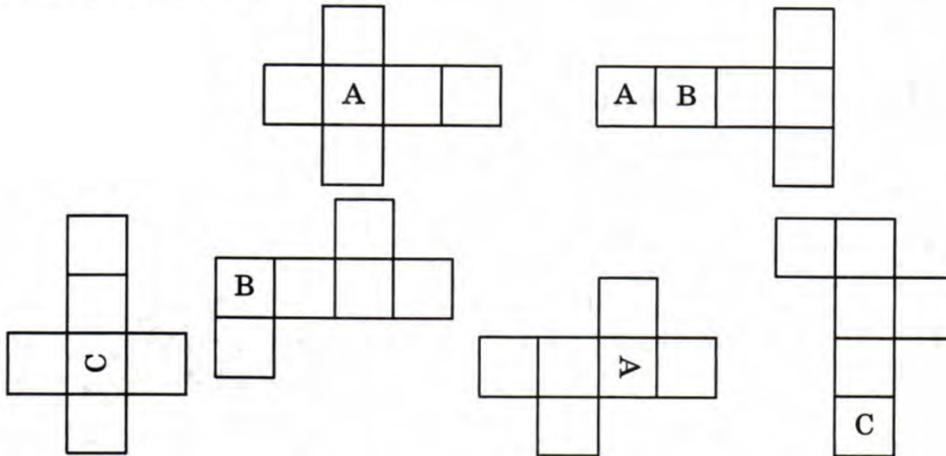
4. A seven-story building has 12 more apartments than a nine-story building. How many apartments are there in each building if both buildings have the same number of apartments on each floor?

5. Ann, Mary, and Peter harvested 75 apples and baked a giant apple pie. When Anna gave 8 apples for the pie, Mary gave 12 apples, and Peter gave 7 apples, each of them had the same number of apples left. How many apples did each of them harvest?

6. On the cube there are three letters A, B and C.



These are cube nets. Write the missing letters on the nets:



7. On the picture, every arm of the balance is in equilibrium. (The horizontal bars are suspended at their midpoints.) Identical shapes have identical masses. Total weight is 16. What is the weight of each shape?

