

## Math 4. Class Work 16

### Variables/Equation

- When we need to write a mathematical expression but don't know the exact numbers to use, we use variables. It can be any symbol, but it's very convenient to use letters:  $a, b, m, n \dots$

**Example:** the number of books on one shelf is  $n$ , and the number of books on the other shelf is  $m$ , then the total number of books on both shelves is  $n + m$ .

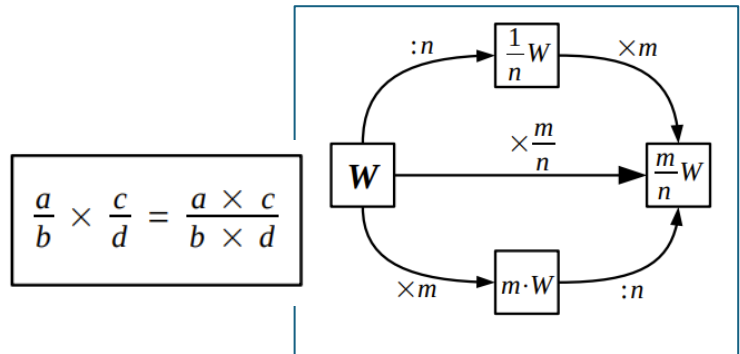
- An equation is an equality with one or more variables; we usually use  $x, y, z \dots$ . To solve an equation means to find such value of the variable(s) that the equation will become a true equality ( $x = \text{number}$ ). We can keep the equality true by adding or subtracting the same quantity (term) on both sides of the equal sign

**Example:**  $3x + 4 = 13$  | subtract -4 on both sides of the equal sign

$$\begin{array}{r} -4 \quad -4 \\ 3x \quad = \quad 13 - 4 \end{array}$$

$3x = 9$  | divide by 3 both sides (remember  $9:3 = 9/3$ )

$$\begin{array}{r} \frac{3}{3} x = \frac{9}{3} \\ x = 3 \end{array}$$



### Problems

- Multiply by a fraction

$2 \times \frac{1}{5} =$

$2 \times \frac{3}{5} =$

$9 \times \frac{5}{12} =$

$\frac{1}{2} \times \frac{1}{7} =$

- An apple costs  $x$  dollars, and a pear costs  $y$  dollars. Explain the expressions below:

$x + y, \quad x - y, \quad 3x, \quad 8y, \quad 3x + 8y, \quad y : x, \quad 120 : y$

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

- The sum of the numbers  $x$  and 15 equals 20.
- The product of  $y$  and 10.
- The difference between three times  $z$  and 4 is equal to 12.
- Half of the number  $b$  is equal to 1.5
- The product of the numbers of 5 and  $x$  is less than 12.

4. Open the parenthesis and simplify the expressions.

a)  $(6x + 4y - 8) : 2 - 2 \cdot (2x + y) =$

b)  $3 \times (y - 3x) - 3 \cdot (x - y - 5) =$

c)  $2 \cdot (5w + y) + (12w - 3y) : 3 =$

5. Solve the equations

a)  $(4x - 6) : 2 + 3 \cdot (x - 5) = 12$

b)  $2 \cdot (7 - x) + 4 \cdot (x - 5) = 8$

6. A teacher opened a box with candies in her classroom to treat her students. If each student takes 4 candies, 19 candies will be left in the box. If each student takes 5 candies, they will be short by 2 candies. How many candies are there in the box?

7. (Solving equations using substitution). There are 27 pencils in two boxes altogether. There are 5 more pencils in one of the boxes than in the other. How many pencils are there in each box?

### Geometry notations

$k = \text{Circ}(M, r=4 \text{ cm})$  - a circle with a center at point M and a radius of 4 cm.

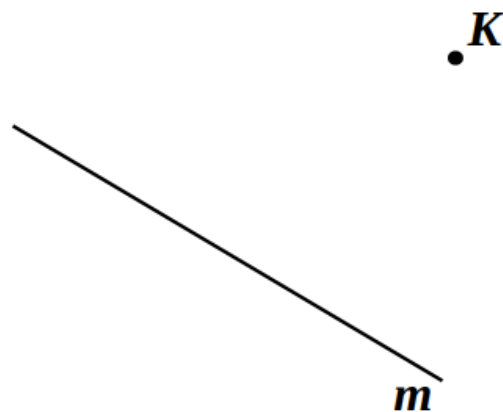
$\{P, Q, R\}$  - a list of points,  $|AB| = 3 \text{ cm}$  - the size of a segment  $\overline{AB}$

$\cap$  - intersection symbol,  $\parallel$  - parallel lines,  $\in$  - belongs to, an element of a list or object

8. Use a straight edge (a ruler) and a compass to plot straight line **KT**  $\parallel$  **m**:

Procedure:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



9. Use a straight edge and a compass to plot straight line  $QX \parallel n$ :

Procedure:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

