

Homework #19.



1. Which sign (+, -, ·, ÷) should be placed instead of * to make the following equalities true statements.

$$\frac{7}{8} * 1\frac{1}{7} = 1$$

$$\frac{3}{7} * \frac{4}{7} = \frac{3}{4}$$

$$2 * 1\frac{1}{3} = \frac{2}{3}$$

$$\frac{3}{10} * \frac{5}{6} = \frac{1}{4}$$

2. Factorize (represent as a product of two or more factors):

$$\frac{3}{4}x + \frac{3}{4}y =$$

$$5a - a^2 =$$

$$-3x - 3m =$$

3. Simplify the following expression:

$$\frac{2}{3} + 2x\left(\frac{1}{2} - \frac{1}{3}y\right) - x - \frac{1}{3}(2 - 2xy) =$$

4. Simplify the following expressions:

$$a \times a \times a \times a \times a \times x \times x \times x \times x =$$

$$3 \times 3 \times x \times x \times x \times y \times y \times y \times y =$$

$$a \times a \times a + a \times a \times a \times a \times a =$$

$$(c + d) \times (c + d) \times (c + d) \times (c + d) =$$

5. Fill the empty spaces in the table:

a	0	1	-1	10	-10	0,1	-0,1	$\frac{1}{2}$	$-\frac{1}{2}$
a^2									
a^3									
a^4									

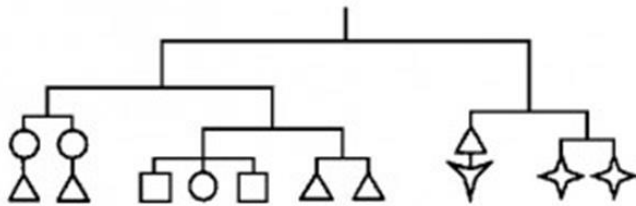
6. 3 identical books and 5 identical notebooks costs 95 dollars, but 1 book and 2 notebooks cost 33 dollars. What is the price of one book and one notebook? (*Hint: use a system of equations and substitution*)

7. Fill in the missing expression in the parenthesis:

a) $x - (\quad) = x - a + b - c$

b) $x - y = (x - a) + (\quad)$

8. On the picture below, every arm of the balance is in equilibrium. (The horizontal bars are suspended at their midpoints.) Identical shapes have identical masses. The mass of the square is 1 kg. What are the masses of the other shapes?



9. There are 40000 books in a library. 75% of all books are in English, 10% of all books are in Spanish and the rest of the books are in French and German. How many books are there in the library in English and in Spanish?

10. Represent number 10 as a sum of two natural numbers, the sum of the squares of these numbers is equal to 58.

11. Raisins are produced by drying grapes. During the process, the weight of grapes is reduced by 70%.

a) How many kg of raisins are produced from 200 kg of grapes?

b) How many kg of grapes should be dried to obtain 15 kg of raisins?

12. A snapping turtle and a painted turtle start to go down to the lake at the same time. The snapping turtle is 80 meters from the lake, and it can crawl 125 cm every 5 minutes. The painted turtle is 16 meters further away from the lake, but it can crawl 12 dm every 4 minutes. Which turtle would reach the lake first if they keep on going at the same speed and never rest?



13. Solve the following equations:

$$x - 5.4 = \frac{1}{6}$$

$$3 - x = 0.003$$

14. Compare using $<$; $>$; $=$

a) 5^2 2^5

b) 1^{10} 1^5

c) 134^1 250^1

d) 12^0 18^0

e) 3^4 $3^5 \cdot 3^{-1}$

f) $(5 \cdot 9)^{15}$ $5^{15} \cdot 9^{15}$

g) $(-2)^3$ -6

h) $(-2)^3$ $(-2)^2$

k) 1^{15} 1^{150}