Algebra and Geometry 1. Homework 19.

1. a. Check the following equalities:

$$\frac{1}{2}-\frac{1}{3}=\frac{1}{2\cdot 3};\qquad \frac{1}{3}-\frac{1}{4}=\frac{1}{3\cdot 4};\qquad \frac{1}{4}-\frac{1}{5}=\frac{1}{4\cdot 5};\qquad \frac{1}{5}-\frac{1}{6}=\frac{1}{5\cdot 6};$$

b. Continue the chain of similar equalities. Write the algebraic expression for the pattern.
c. Use the previous conclusion to simplify the following expressions:

$$\frac{1}{1\cdot 2}+\frac{1}{2\cdot 3}+\frac{1}{3\cdot 4}+\cdots+\frac{1}{n(n+1)};$$

$$\frac{1}{x(x+1)}+\frac{1}{(x+1)(x+2)}+\frac{1}{(x+2)(x+3)}+\cdots+\frac{1}{(x+99)(x+100)};$$

2. Represent as a fraction:
Example:

$$6+b-\frac{12b}{6+b}=\frac{6(6+b)}{6+b}+\frac{b(6+b)}{6+b}+\frac{12b}{6+b}=\frac{36+6b+6b+b^2-12b}{6+b}$$
$$=\frac{36+12b+b^2-12b}{6+b}=\frac{36+b^2}{6+b}$$

$a.\ 2x-y-\frac{2x-y^2}{y};\qquad b.\ 1-a+\frac{a^2-3}{3+a};\qquad c.\ \frac{a^2+b^2}{2a+b}+2a-b;$

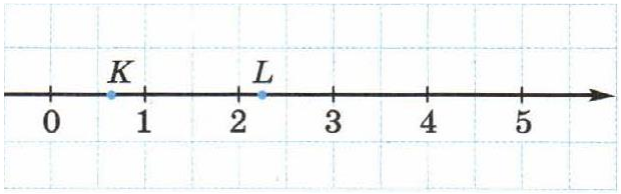
3. Fill the table:

x	-5	-4	-3	-2	-1	0	1	2	3	4	5
a^x											
$\left(\frac{1}{2}\right)^x$											

4. Find the values of expressions x, $(x+1)^{-1}$, and $(2x)^{-1}$ if it's known that
$a.\ x^{-1}=10;\qquad b.\ x^{-1}=0.1;\qquad c.\ x^{-1}=1$

5. Robert walks from his home to school with the speed of 4 km/h. On Monday he left the house at the usuale time but he rode the bike with the speed of 12 km/h. He was at school 15 minutes earlier then usual. What is a distance between school and Robert's house?
6. How many gramms of water should be added to 80 g of the soluthion cantaining 15% of salt to get a 12% salt solution?

7. By letters K and L two out of four following numbers are marked: $\sqrt{3},\ \sqrt{5}, \sqrt{0.4}, \sqrt{7}$. Which numbers are marked by these letters?

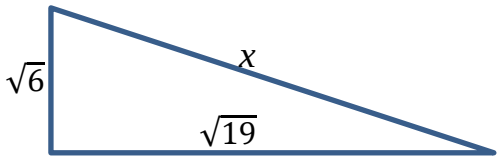


8. Without using calculator compare:

$3 \ldots \sqrt{11}$	$11 \ldots \sqrt{110}$	$22 \ldots \sqrt{484}$
$5 \ldots \sqrt{20}$	$17 \ldots \sqrt{299}$	$35 \ldots \sqrt{1215}$

9. Simplify the following expression:
$$\frac{\frac{1}{a+b}-\frac{1}{a-b}}{\frac{1}{a+b}+\frac{1}{a-b}} \cdot \frac{a}{b};$$

10. Find the *x*.



11. Evaluate:
Example:
$$2\sqrt{10} \cdot \sqrt{10} = 2 \cdot \sqrt{10 \cdot 10} = 2\sqrt{100} = 2\sqrt{10^2} = 2 \cdot 10 = 20$$

a. $3\sqrt{15} \cdot 6 \cdot \sqrt{15}$; *b.* $3\sqrt{7} \cdot 10\sqrt{7}$; *c.* $\left(3\sqrt{8}\right)^2$; *d.* $\left(2\sqrt{11}\right)^2$.