Accelerated math. Homework 5.

Problems marked with * are more difficult.

1. Compute:

1) $\frac{1}{2}\cdot\frac{2}{3}\cdot\frac{3}{4}\cdot\frac{4}{5}$;

2) $\frac{6}{7}\cdot\frac{7}{8}\cdot\frac{8}{9}\cdot\frac{9}{10}\cdot\frac{10}{11}$;

3) $\frac{1}{2}\cdot\frac{2}{3}\cdot\ldots\cdot\frac{23}{24}\cdot\frac{24}{25}$;

4) $1\frac{1}{2}\cdot 1\frac{1}{3}\cdot 1\frac{1}{4}\cdot 1\frac{1}{5}$;

5) $\left(1+\frac{1}{4}\right)\cdot\left(1+\frac{1}{5}\right)\cdot\left(1+\frac{1}{6}\right)\cdot\left(1+\frac{1}{7}\right)\cdot\left(1+\frac{1}{8}\right)$;

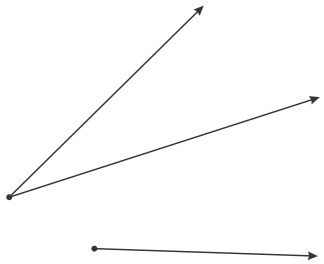
6) $\left(1-\frac{1}{2}\right)\cdot\left(1-\frac{1}{3}\right)\cdot\left(1-\frac{1}{4}\right)\cdot\ldots\cdot\left(1-\frac{1}{99}\right)\cdot\left(1-\frac{1}{100}\right)$.

2. Fill in the missing number to have the right equalities.

$\frac{2}{5}\cdot\underline{\quad}=1$ $\quad 2\frac{1}{2}\cdot\underline{\quad}=1$ $\quad 1:\frac{2}{5}=\underline{\quad}$ $\quad 1:\underline{\quad}=\frac{7}{4}$

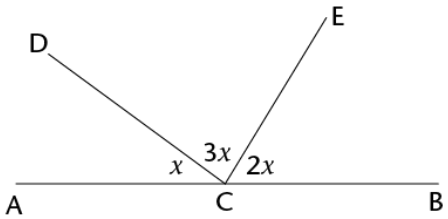
$\underline{\quad}\cdot\frac{12}{11}=1$ $\quad \underline{\quad}\cdot 1\frac{1}{3}=1$ $\quad 1:\frac{12}{11}=\underline{\quad}$ $\quad 1:\underline{\quad}=\frac{3}{10}$

3. Into how many parts do 3 rays on the picture below divide a plane? Draw 3 rays in a way that they divide the plane into 3 parts, 4 parts, do not divide a plane into parts. (Any 2 points in the same part can be connected without crossing the edge, not necessarily by a straight line)



4. A (natural) number which is less than 30 upon division by 2, 3, and 4 gives the remainder 1. What is this number? (Find all possible solutions).

5. Calculate the measure of angle x from the picture below (points A, C and B lie on the same line)

6. 

7. Fill up the table:

a	*5*		*-8*		*-(-189)*	*43*
-a		*-2*		*8*		

8. Pencils are packed into big and small boxes. In 4 big and 3 small boxes there are 132 pencils, in 2 big and 3 small boxes there are 84 pencils. How many pencils are there in one small box?

9. 4 little ducklings and 5 little geese weight 4 kg and 100 g. 5 little ducklings and 4 little geese weight 4 kg. How much does one little goose weight?

10. Solve the following equations:

$$x + \frac{4}{5} = \frac{9}{10} \qquad y - \frac{4}{9} = \frac{5}{6} \qquad \frac{1}{2}z + \frac{3}{4} = \frac{3}{2}z - \frac{1}{4}$$

11. Simplify the following expressions:
    a. $2 + 3a + xy + 4 - a + xy - 6 =$
    b. $d - 4 + t + t + 32 + 3d =$
    c. $x + 5s - 3s + 2x =$

12. On the first shelf there are 5 more books than on the second shelf and 5 less than on the third shelf. There are 105 books altogether. How many books are there on each shelf? (Write an equation to solve the problem.)

13.

$$2(4 + 9w) = \qquad (2 - 5m) \cdot (-5) =$$

$$-8(6x + 3) = \qquad 4(-6z + 4) =$$

$$-4(-4d - 5) = \qquad -9(n - 4) =$$

$$-6(8p + 3) = \qquad (-5d + 1)(-2) =$$

$$2(3v - 8) = \qquad -4(9k + 9) =$$

14.