Math 4d. Homework 16.

1. Simplify the following fractions:

   $a.\ \frac{5!}{7!};$ $b.\ \frac{n!}{(n-2)!};$

2. How many three-digit numbers can be composed from digits 1, 2, 3 without repetition of digits? (all three digit in a number must be different)

3. How many three-digit numbers can be composed from digits 1, 2, 3, if repetition is allowed? (number can contain same digit, for example 111, 122, 331 are possible)

4. A musketeer has three beautiful hats, four elegant tabards, and two pairs of excellent boots. How many different costumes can he wear? (Tabard - a sleeveless jerkin consisting only of front and back pieces with a hole for the head.

5. Mom has two apples, two bananas, and a peach to give to her kid for lunch. How many different ways are there for her to do it during one week? (Apples are identical)

6. Mary and Paula have to mail 1000 envelopes for a new marketing campaign. Mary can do the job alone in 6 hours. If Paula helps, they can get the job done in 4 hours. How long would it take Paula to do the job by herself?

7. Evaluate:
   Hint: $\frac{4.5}{4.2} = \frac{4.5\cdot 10}{4.2\cdot 10} = \frac{45}{42} = \frac{15\cdot 3}{14\cdot 3} = \frac{15}{14}$. Try to simplify first whenever possible.

   $$\frac{\left(\frac{2.1}{0.4} + \frac{3.3}{1.8}\right) : 0.51 \cdot 0.36}{2\frac{2}{3} \cdot \left(\frac{4.5}{4.2} - \frac{1.6}{2.8}\right)}, \qquad answer\ is\ \ 3\frac{3}{4}$$

   You need to show your work.

8. There are 21 juice bottles out of which 7 bottles are full, 7 are half-full and the remaining 7 are empty to be divided among 3 friends equally. You don't have any measuring device. How will you divide them (both bottles and juice) equally?

9. Compare ***without*** doing any calculation:

   $2.4 \cdot 4.2 \ \dots \ 4.2;$ $\qquad$ $0.3 \cdot 3 \ \dots \ 3;$ $\qquad$ $0.3 \cdot 3 \ \dots \ 0.3$

   $1.2 : 4 \ \dots \ 1.2;$ $\qquad$ $1.2 : 0.4 \ \dots \ 1.2$ $\qquad$ $0.4 : 1.2 \ \dots \ 0.4$

10. Compare if possible (a is a positive ($a > 0$) number, not necessarily a natural number):

    $a \cdot \frac{1}{2} \ \dots \ a;$ $\qquad$ $a \cdot 0.3 \dots a;$ $\qquad$ $a : \frac{1}{2} \dots \ a;$ $\qquad$ $a \cdot 2 \dots \ 2;$

    $a : 0.7 \dots \ a;$ $\qquad$ $a : 0.7 \dots 0.7;$ $\qquad$ $a \cdot 100 \dots \ 1000;$ $\qquad$ $a : 100 \ \dots 1000$