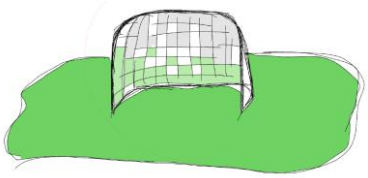
Math 4d, Homework 2.

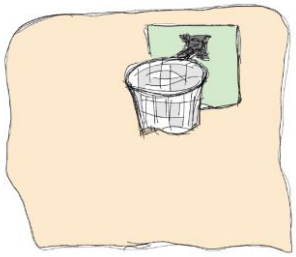
1. $A = \{a, b, c, 1, 2\}, B = \{1, 2, 3, 4\}$. Write the intersection ($A \cap B$) and the union ($A \cup B$) of these two sets.

2. There are 20 students in a Math class. 10 students like apples and 15 students like pears.
   Show that there are some students who like both apples and pears.
   Is it possible to determine if there are any students who do not like apples and do not like pears?
   Assume that each student likes at least one of the fruits. (This means that each student like either apples, or pears, or both). How many students like both pears and apples?
   If yes, explain how you can do it. If no, demonstrate by giving examples.

3. The same Math class (with 20 students) forms a soccer team and a basketball team. Every student signs up for at least one team:



   - 12 students play only soccer;
   - 2 students play both soccer and basketball;



   How many students play basketball only?

4. Students who participated in math coopetition had to solve 2 problems, one in algebra and another in geometry. Among 100 students 65 solved algebra problem, 45 solved geometry problem, 20 students solved both problems. How many students didn't solve any problem at all?

5. 240 students from New-York and Seattle attended a math camp. Of the total number of students, 125 were boys. 65 boys were from New-York. There were 53 girls from Seattle. How many students came from New-York?

6. In 2 boxes there are 160 notebooks altogether. In one box there are 20 more notebooks than in the other. How many notebooks are there in each box?
7. Put arithmetic signs $(+, -, \div, \times)$ and parenthesis, if needed, between these numbers so that the equalities hold:

$4\ 4\ 4\ 4 = 1$ $\qquad$ $4\ 4\ 4\ 4 = 6$

$4\ 4\ 4\ 4 = 2$ $\qquad$ $4\ 4\ 4\ 4 = 7$

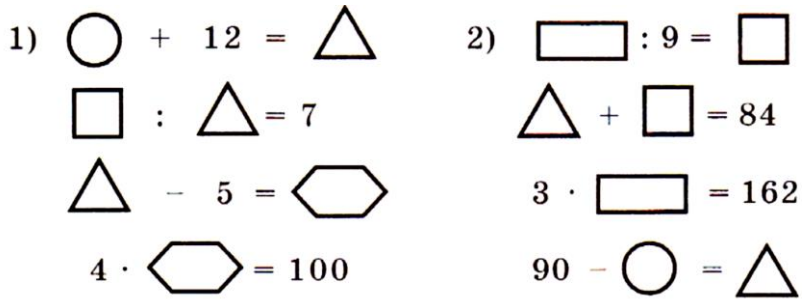
$4\ 4\ 4\ 4 = 3$ $\qquad$ $4\ 4\ 4\ 4 = 8$

$4\ 4\ 4\ 4 = 4$ $\qquad$ $4\ 4\ 4\ 4 = 9$

$4\ 4\ 4\ 4 = 5$ $\qquad$ $4\ 4\ 4\ 4 = 10$

It can be done by different ways. How many different ways you can find?

8. Which numbers are represented by the figures in following problems:



9. Viktor has 2 more sisters then brothers. How many boys and girls are there in the Victor's family, if they have 5 kids altogether? If they have 7 kids altogether?