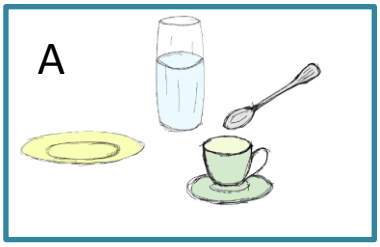
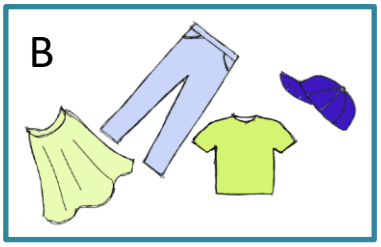
Math 4a, Homework 2.

Exercises:
Please do ## 1, 2, 4, 5, 7, 8, 10, 11,12.

1. $A = \{a, b, c\}, B = \{1, 2, 3, 4\}$. Write the intersection $(A \cap B)$ and the union $(A \cup B)$ of these two sets. **(4)**
2. Which word we can use to describe a set, subset of which is drawn on the pictures below:





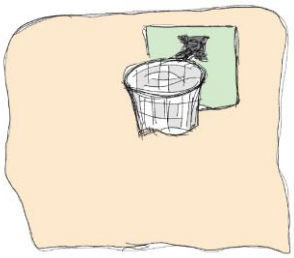
(4)

List a few other members of these sets.

3. 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? **(6)**
   If yes, explain how you can do it. If no, demonstrate by giving examples.

4. 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?

(6)

5. 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? **(8)**
6. 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)**
7. 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? **(6)**
8. Place parentheses into the following expression so that the statement is true.
   a. $1\,5 - 3\,5 + 5 \div 4 = 5$
   b. $60 + 40 - 16 : 4 = 66$
   c. $24 : 56 - 8 * 4 = 1$
   d. $96 - 12 * 6 : 3 = 8$
   e. $64 : 64 - 8 * 4 = 2$
   f. $63 : 9 + 54 = 1$
   g. $75 - 15 : 5 + 10 = 22.$

   (6)
9. John came to a lemonade stand with a big empty pitcher which can hold 5 liters of lemonade. He wanted to buy only 1 liter of lemonade, but a merchant had jars which can hold 3 liters and 2 liters of liquid. How merchant can measure 1 l. of lemonade if jars do not have any marks on them? Next time when John came to the stand with exactly the same pitcher, the merchant had only 3l and 5l jars. Can he sell to John exactly 4 l of lemonade? **(8)**

10. Draw two segments AB and CD in such way that they intersect
    a. by a point
    b. by a segment
    c. don't intersect at all.

    (6)
11. Using a ruler draw a straight line, put on it 3 points, *A*, *B*, and *C* so that 2 rays are formed, *BC* and *BA*. **(4)**
12. Draw two rays AB and CD in such way that their intersect
    d. by a point
    e. by a segment
    f. by a ray

g. don’t intersect at all

13. On the segment *AB* mark a point *M*. How many segments do we have on the picture? Mark another point *P*. How many segments do we have now? Mark a third point *F*. Count segments. How many segments will be if you mark 5 points? 10 points? **(8)**