Venn Diagrams

September 20, 2014

1 Warm up

1. On the table there are 20 fruits: oranges and peaches. Whenever you take 8 fruits there always will be at least one apple. Whenever you take 14 fruits there always will be at at least one peach. How many apples and how many peaches are on the table?

2. In Math Circle the students were given two problems, A and B. The teacher made four lists of students:

   (a) the students who solved the probem A only.

   (b) the students who solved the probem B only.

   (c) the students who solved at least one problem

   (d) the students who solved both problems

   Which list is the longest? The shortest? Can two of the lists be the same? Which ones?

3. In a Wonderland there are wizards, magicians and sorcerers. Not every wizard is a magician. If a sorcerer is not a magician, then he is not a wizard. Is every wizard necessarily a sorcerer?

4. Which set is bigger?

   - all the kids except those kids who are not red-headed,
     or
   - all the read-headed except of those who are not kids.

5. The distance from my home to the nearest ice cream store is 800 m. The distance from my home to school is 600 m. What could be a maximal distance from my school to the ice cream store? What could be a minimal distance?

2 Draw a diagram and solve

1. One hundred kids went to cinema on Sunday. For the morning movie 87 tickets were sold, while for the afternoon movie 63 tickets were sold. How many kids watched both movies?

2. In our bakery there are two kinds of cakes: apple cake and cheese cake. Every customer buys at most one cake of each kind. Today 57 apple cakes and 36 cheese cakes were sold. 12 customers bought both cakes. How many customers came to the bakery?

3. There are 29 students in our class. 15 students swim after school and 21 play soccer. 3 students do not do any of these sports. How many kids both swim and play soccer?

4. WRITE YOUR PROBLEM HERE

3 A bit more challenge

1. There are 30 people in the room. 19 of them are at least 19 years old, while 20 of them are less than 20 years old. How many people in the room are exactly 19 years old?

2. 25 kids came to the first grade. 12 of them can read, 8 can write and 9 of them can do math. Besides 4 can read and write, 5 can read and do math and 3 of them can write and do math. Only two students can read, write and do math. How many students can neither read nor write nor do math?

3. How many numbers between 1 and 60 are divisible by 2?

   How many numbers between 1 and 60 are divisible by 3?

   How many numbers between 1 and 60 are divisible by 3, but not divisible by 2?

   How many numbers between 1 and 60 are divisible by 2, but not divisible by 3?

   How many numbers between 1 and 60 are neither divisible by 2 nor by 3?

4. How many numbers between 1 and 1000 are neither squares not cubes?

4 More problems

1. There are fruits on the table: apples and pears. The number of the apples is less by 8 of the number of all fruits and the number of pears three times less than the number of all fruits. How many apples and how many pears are on the table?

2. In the class one third of all the girls can read and half of those who can read are girls. Are there more girls or those who can read?

3. Every seventh mathematician is a philosopher and every nineth philosopher is a mathematician. Are there more philosophers or mathematicians?

4. Students from 5-th and 6-th grade came to a Halloween party. Some were dressed as monsters and some as wizards. There were 24 6-th graders and 16 wizards. Number of 5-th graders dressed as monsters was equal to the number of 6-th graders dressed as wizards. How many students came to the party?