

## One-to-one correspondence

What did you learn in your first math class at elementary school? I learned one-to-one correspondence in mine. Say there are two groups of people: group A and group B. Let's say each member of group A make a pair with each member of group B. If any member(s) of A cannot make pair(s) with members of B, even though every member of B can make a pair with a member of A, we say that the number of members of A is bigger than the number of members of B. See Fig. 1. A is a group of red balls and B is a group of green balls.

If any member(s) of B cannot make pair(s) with members of A, even though every member of A can make a pair with a member of B, we say that the number of members of A is smaller than the number of members of B. See Fig. 2.



Figure 1: There are more red balls than green balls.

Figure 2: There are less red balls than green balls

If every member of A can make a pair with every member of B, and no one is left, we say that the number of members of A and the number of members of B are the same. See Fig. 3.

Making a pair is the concept of what mathematicians call “one-to-one correspondence.” We say that there is a one-to-one correspondence between members of A and members of B if there is a unique counterpart in B for any member of A, and there is a unique counterpart in A for any member of B. This happens only if the number of members of A is equal to the number of members of B. A simple and obvious concept, isn't

it? Why do I bother explaining it? Many math concepts cannot be properly explained without this concept, as you will see later.

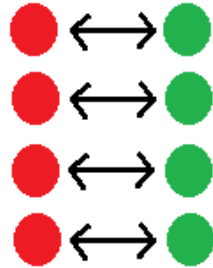


Figure 3: There are equal number of red balls and green balls.

## Summary

- If there is a one-to-one correspondence between two sets, the number of elements of the two sets is equal.