

## The 4 Numbers Game

This game is similar to the very popular game '24', although it is slightly different in focus. In '24', the competitors are given 4 numbers, and they have to combine them with arithmetic operations to give a result equaling 24.

In this game, like '24', the competitors are given 4 numbers, but the object is to create as many different numbers as possible.

### Assigning Teams

'Teams' can be created in any of the following ways:

- Divide the class into several groups of five or six, each group being a team
- Divide the class into pairs, with each person competing against their partner
- Each student competes against all the other students in the class
- The game can also be played as a solitaire game

### Picking Numbers

Once the teams are arranged, the numbers to be used in the game are selected. The teacher can randomly select four numbers from one to nine, or the numbers can be selected by drawing slips of paper, or by rolling dice. (Note: Rolling dice means that the numbers will be limited to six, rather than nine, but the game can still be played.)

### Playing the Game

Once the students know the four numbers, they work to combine those four numbers using addition, subtraction, multiplication, and division to create as many different numbers as they can. The following example shows how a student might make the numbers from one to ten using the four numbers 6, 3, 3, and 4.

- 1:  $6 - 4 - (3 / 3)$
- 2:  $6 / 3 * (4 - 3)$
- 3:  $6 / 3 + 4 - 3$
- 4:  $6 * (3 - 3) + 4$
- 5:  $(3 + 3) / 6 + 4$
- 6:  $4 * (3 - 3) + 6$
- 7:  $(6 + 3) / 3 + 4$
- 8:  $6 + 3 - 4 + 3$
- 9:  $(6 + 3) / (4 - 3)$
- 10:  $6 + 4 + 3 - 3$

### Ending The Game

The best way to end this game is generally to set a time limit--for example, to time the students for five minutes, then count which team (or student) has created the most numbers. One good way to tally the score is to have students (teams) exchange papers, and have opposing teams try to find mistakes. Give one point for each number created.

### Problem Solving

Like the game '24', this game gives students some fun problem solving experience, but is easier for younger students. As students play the game again and again, they begin to notice patterns which make the object easier to accomplish. For example, if the numbers are 4, 3, 6, and 1, many students will begin to notice that if they combine 4, 3, and 6, then they can use the 1 to create three different numbers:

- 4 =  $(6 + 3 - 4) - 1$
- 5 =  $(6 + 3 - 4) * 1$
- 6 =  $(6 + 3 - 4) + 1$

In addition, students will begin to recognize number pairs that can be helpful. For example, since  $(4 - 3) = 1$ , we can use this number pair as we would use 1:

- 6 =  $(6 + 1) - (4 - 3)$
- 7 =  $(6 + 1) * (4 - 3)$
- 8 =  $(6 + 1) + (4 - 3)$