

RACE TO 43

Aims:

To develop a winning strategy for what is a simple two player game.

After explaining that the following two player game can **always** be won by the player who starts, I then invite members of the class to challenge me for a simple wager; usually a sweet! The volunteer obviously makes the first move.

After a few demonstrations (in which the students usually always lose!) the class are then invited to try and devise a winning strategy for player 1.

Get them to work in pairs where they can test their strategies on each other. Obviously the final test is whether they can beat the teacher!

Alternatively, you might suggest that the students challenge their parents to a game in which the wager is for a week's doubled pocket money! (I normally take 50% of the proceeds!)

Rules of the game.

Two players take it in turns to choose a number between 1 and 6.

The winner is the player who, on selecting a number, brings the total of all the chosen numbers to 43.

Winning strategy.

On dividing 43 by $(6 + 1)$ we have a remainder of 1.

Player one therefore starts with number 1.

Player two can therefore bring the total up to a maximum of 7 (by selecting 6).

Player one chooses whatever number brings the total up to 8.

Player two can therefore bring the total up to a (theoretical) maximum of 14.

Player one chooses whatever number brings the total up to 15.

Player two can therefore bring the total up to a (theoretical) maximum of 21.

Player one chooses whatever number brings the total up to 22.

etc.

In short, player one ensures that he/she chooses numbers to give a running total of 1, 8, 15, 22, 29, 36, 43.

Extension.

Change the total and the maximum number which players can choose.

Beware though, if the total is a multiple of the (max. number + 1), then player 2 can always win!