

Data sheet

Game of '31'

In the game of '31' two people take it in turns to add numbers to a total that starts at zero. The only numbers they can add are chosen from

1 2 3 4 5 6

These numbers can each be used more than once. As each turn proceeds, the total increases. The person who finally reaches 31 is the winner.

For example, with two players A and B:

	0	
A goes first and adds 4	4	
B adds 5	9	
A adds 2	11	
B adds 1	12	
A adds 5	17	
B adds 3	20	
A adds 4	24	
B adds 1	25	
A adds 6	31	A wins.

Winning strategies

Some people suggest you can always win a game of '31' if you are the person who has the first go.

Others suggest that a way to win is to follow the other person's go with the number that combines with theirs to make a total of 7 eg if they add 4, you add 3; if they add 1, you add 6 etc.

Others say that to win the game of '31' you should make sure you are the person who makes a total of 24

Other versions

Other versions of the game can be made by changing the target total from 31, changing the numbers you can use to make the total, and changing the operation from addition.

Questions

Game of '31'

1

Jack and Sarah are playing '31'
The total so far is 23
It is Jack's turn and he chooses '3'

What number must Sarah now choose in order to win the game?

2

Andy and Megan are playing '31'

The total so far is 21
It is Megan's turn.

What numbers could Megan choose so that Andy cannot win on his turn?

3

Explain how, if you make the total of 24 on your turn, you can guarantee that you will win the game.

4

In a game of '31', Andy makes a total of 12.
What number should Megan now choose, to guarantee that she can reach a total of 24?

5

Luke and Emma play a new game called '42'.
In this game you have to make a total of 42 and you can choose any of the numbers 1, 2, 3, 4, 5, 6, 7, 8

Luke says

If you can reach a total of 34 on your turn, you can always win the game.

Emma says

The number you must reach in order to win is 33

Who is correct?

Explain why.

6

Another game is to start at 50 and subtract any of the odd numbers

1 3 5 7 9

from the total. The winner is the person who reaches zero.

Aaron and Zoe play this game.

Aaron goes first.

Show how Zoe can always make the totals 40, 30, 20, 10, 0 on her turns and so be sure of winning the game.

