

Salsa Rueda Dance Problem

In dancing Salsa Rueda, the couples are arranged in a circle with the leader on the right side of the follower. How many different ways are there to pair up a whole group if you have 20 people?

1. We want to keep track of who is leading and who is following and distinguish between those situations. We don't want to worry about gender for now, so everybody can lead or follow according to their liking or ability. As an example if Jane is dancing with Sarah and Jane is leading then that is different from Jane dancing with Sarah and Sarah is leading.

a. Give a first, rough estimate how many ways there are to give everybody a partner if you have 20 people? (You will not be graded on the accuracy of this estimate.)

b. How many ways are there to give everybody a partner if you have 4 people and you want to distinguish between leaders and followers? Draw a picture that explains your reasoning.

c. How many ways are there to give everybody a partner (distinguishing leader and follower) if you have 6 people? Draw a picture that explains your reasoning.

d. How many ways are there to give everybody a partner (distinguishing leader and follower) if you have 8 people?

e. How many ways are there to give everybody a partner (distinguishing leader and follower) if you have 10 people?

f. Collect your data in a table. Do you see a pattern? Describe the pattern and explain what you see.

g. Now find out precisely how many ways there are to give everybody a partner (distinguishing leader and follower) if you have 20 people?

h. How would you use the pattern you observed to find this total for any other number of dancers?