

Pair counting — Up to 25 members

Name: _____

Date: _____

Count the pairs without listing them. Show your working.

- 1 A league has 7 teams. Every team plays every other team once.

How many matches are played?

Why Each of the 7 meets the other 6, which is $7 \times 6 = 42$. But that counts every pair twice — once from each end — so halve it: $42 \div 2 = 21$ matches. More than one way works here, and the other needs no halving at all: the first meets 6, the second meets 5 it has not met yet, and so on down to 1. Adding $6 + 5 + \dots + 1$ gives the same 21. This method counts every pair once from the start, so there is nothing to halve at the end.

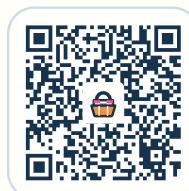
21

- 2 22 offices are connected so that each one can call each of the others directly, and a call from A to B is not the same as a call from B to A.

How many different calls are possible?

Why

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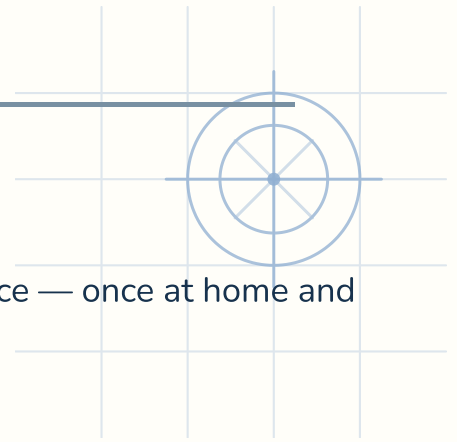


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Count the pairs without listing them. Show your working.



- 3 A league has 9 teams. Every team plays every other team twice — once at home and once away.

How many matches are played?

Why

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- 4 A league has 6 teams. Every team plays every other team once.

How many matches are played?

Why

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Pair counting · Up to 25 members — Answer key

If they are stuck

- Pick one of them and count who they meet. Is that true of every one of them?

1. Each of the 7 meets the other 6, which is $7 \times 6 = 42$. But that counts every pair twice — once from each end — so halve it: $42 \div 2 = 21$ matches. More than one way works here, and the other needs no halving at all: the first meets 6, the second meets 5 it has not met yet, and so on down to 1. Adding $6 + 5 + \dots + 1$ gives the same 21. This method counts every pair once from the start, so there is nothing to halve at the end.

3. Each of the 9 meets the other 8, and this time the two directions are different events. So $9 \times 8 = 72$ matches, with no halving.

2. Each of the 22 meets the other 21, and this time the two directions are different events. So $22 \times 21 = 462$ calls, with no halving.

4. Each of the 6 meets the other 5, which is $6 \times 5 = 30$. But that counts every pair twice — once from each end — so halve it: $30 \div 2 = 15$ matches. More than one way works here, and the other needs no halving at all: the first meets 5, the second meets 4 it has not met yet, and so on down to 1. Adding $5 + 4 + \dots + 1$ gives the same 15. This method counts every pair once from the start, so there is nothing to halve at the end.

