

The Party Problem

Solution

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The woman's husband shook four people's hands.

Nobody can shake more than eight hands: there are nine other people, and one is their partner. The nine answers are all different, so they must be exactly

0, 1, 2, 3, 4, 5, 6, 7, 8.

The person who shook eight hands shook everyone's hand except their partner's. In particular, the person who shook zero hands must be that partner. Thus 0 and 8 form a couple.

Temporarily remove that couple. Every remaining person shook the 8-person's hand and did not shake the 0-person's hand. Subtracting that one handshake from the remaining reported counts leaves the same sort of problem on four couples, with reported counts 0 through 6. Its extremes must again be partners.

Returning to the original counts, this pairs 1 with 7. Repeat to pair 2 with 6 and 3 with 5.

Of the nine people who answered, only the person who said 4 is left unpaired. All the removed people were paired with their own partners. Therefore the remaining respondent must be the questioner's husband.

The questioner herself also shook four hands: one with each of the four removed couples' higher-count members, and none with the lower-count members. But only the husband's count was asked for.

History and sources: [companion history PDF](#).