

Problems of the Weeks

August 2019

After a long day at a conference, a group of 12 mathematicians decide to get together and go barhopping to blow off steam. On their way to the first bar, they find themselves splitting up into 4 sub-groups of 3 people each. In the bar, these sub-groups of 3 stay fixed, with every group of 3 chatting amongst themselves. Moving onto the second bar, the sub-groups split up and rearrange into a new configuration, again with 4 sub-groups of 3 mathematicians each. Every mathematician wants to get some time in one of these sub-groups with every other mathematician in the party, so they try and rearrange to make as many new meetings as possible.

By the end of the night, the mathematicians have visited a whopping 5 bars, rearranging the groups between every bar. They are now tired and ready to get some sleep before doing whatever it is mathematicians do during the day.

Q: Is it possible for every mathematician to have shared a sub-group with every other person in their party by the end of the night?

Acceptable answers will be either a demonstration of how the mathematicians could pull this off, or an argument that it is impossible. Please submit any answers with name and Dukes email to the Problem Box in Roop 103 for a chance to win a \$10 Chipotle gift card!