



© 1997–2004, Millennium Mathematics Project, University of Cambridge.

Permission is granted to print and copy this page on paper for non-commercial use. For other uses, including electronic redistribution, please contact us.

Sep 2001

Features



Answers



1. The Ramsey number $R(2,5)$

This is the number that will answer the question, "how many people do we need, to be sure of having either two friends, or five strangers?"

But of course, if there are *any* two people in the room who know each other, that gives us our two friends. On the other hand, if not, then all the people in the room are mutual strangers. So as long as there are five people, there must be either two friends or five strangers.

In short, $R(2,5)=5$. Of course, the same reasoning would have worked with another number instead of 5, so more generally we can say that $R(2,a)=a$, for *any* number a .

2. The connection between $R(a,b)$ and $R(b,a)$

Mathematically, there is nothing special about the words "friends" or "strangers" – or, looked at another way, the colours "blue" and "red". Whenever you have a graph with blue and red lines, you could swap them round so that the red ones become blue, and vice versa.

Therefore, if a group of people is large enough that it must contain either a mutual friends or b mutual strangers, it must equally be true that it contains either a strangers or b friends. In other words, $R(a,b)=R(b,a)$. A mathematician would say that the function R is *symmetric*.

Answers



Plus is part of the family of activities in the Millennium Mathematics Project, which also includes the NRICH and MOTIVATE sites.