

MATH FOR KIDS
October 13, 2003

More Pigeon Hole Problems:

1. A bag contains beads of two colors: black and white. What is the smallest number of beads which must be drawn from the bag, without looking, to be sure that among the beads drawn there are two of the same color?
2. The village of Small Otters has 200 inhabitants. Show that two of these have the same number of coins in their pockets, if it is known that no person has more than 150 coins in his or her pocket.
3. One million pine trees grow in a forest. It is known that no pine tree has more than 600,000 pine needles on it. Show that two pine trees in the forest have the same number of pine needles.
4. Twenty-five crates of apples are delivered to a store. The apples are of three different varieties, but in each crate all the apples are of the same varieties. Show that among these crates, there are at least nine containing the same varieties of apples.
5. Given twelve integers, show that two of them can be chosen whose difference is divisible by 11.
6. Show that in any group of five people, there are two who have an identical number of friends within the group.
7. Several football teams enter a tournament in which each team plays with every other team exactly once. Show that at any moment during the tournament there will be two teams which have played, up to that moment, an identical number of games.
8. Integers are placed in each entry of a 10×10 table, with no two neighboring integers differing by more than 5 (two integers are considered neighboring if their squares share a common edge). Prove that two of the integers must be equal.