

1023-D1-1126 **Thomas Koshy***, Framingham State College, Framingham, MA 01701-9101. *Derangements, Probability, and Calculus.*

The problem of derangements, originally proposed at the beginning of the 18th century, can be stated in a number of ways: Two of them are:

• There are n married people on a dance floor. In how many different ways can they dance in such a way that no person dances with his/her spouse? • Suppose n guests check in their coats at the coatroom of a fancy restaurant. In how many different ways can the attendant return their coats, so no person gets his/her coat?

Thus the derangement problem can be stated as follows: A derangement is a permutation of n items a_i such that $a_i \neq a_i$ for every i . Find the number D_n of derangements of n items. We shall develop two recursive definitions of D_n , show how the problem provides a bridge between probability and calculus, and four explicit formulas for D_n . (Received September 25, 2006)