

Exact and asymptotic enumeration of integer partitions

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A partition of n is a non-increasing sequence of positive integers whose sum is n . Though their definition is easy to state, partitions are very difficult to count, and no simple formula is known for their number. However, it is possible to obtain nice asymptotics formulas. This was first done by Hardy and Ramanujan using the circle method, which relies on the modularity of the generating function for partitions. In the first part of the presentation, we will discuss their method and our recent generalisation to Jacobi forms. Another approach is to show that different sets of partitions have exactly the same cardinality. For example for all n , the number of partitions of n into distinct numbers equals the number of partitions of n into odd numbers. In the second part of the talk, we will discuss identities of this type - some arising from representation theory - and present a new method to refine and generalise them.