Lower order terms in Szego type asymptotic formulas

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We present two results. The first is a three term Szego type asymptotic formula for a zeroth order pseudodifferential operator (PsDO) on a Zoll manifold of an arbitrary dimension. An example is a Szego type asymptotics for multiplication by a smooth function on a sphere of any dimension. The second result is a four term Szego asymptotics for a PsDO on the unit circle. The proofs utilize a combinatorial formula which generalizes the formula of G.A.Hunt and F.J.Dyson given in an article by M.Kac, where the usual Strong Szego Limit Theorem is provided with a simple combinatorial proof.