ABSTRACTS OF PAPERS

SUBMITTED FOR PRESENTATION TO THE SOCIETY

The following papers have been submitted to the Secretary and the Associate Secretaries of the Society for presentation at meetings of the Society. They are numbered serially throughout this volume. Cross references to them in the reports of the meetings will give the number of this volume, the number of this issue, and the serial number of the abstract.

287. C. R. Adams and J. A. Clarkson: *The type of certain Borel sets in several Banach spaces.*

Let AC represent the class of functions $x(t)$ absolutely continuous on $0 \leqq t \leqq 1$, CBV the class of continuous functions of bounded variation, C the class of continuous functions, R the class of properly Riemann integrable functions, and R^* the class of properly or improperly Riemann integrable functions. Oxtoby (see this Bulletin, vol. 43 (1937), pp. 245–248) has shown that the subsets C, R, and R^* of each space $L_p([0, 1])$, $(p \geqq 1)$, are $F_{\sigma\delta}$ sets of first category. In the present paper, the determination of their Borel type is completed by showing that each is no $G_{\delta\sigma}$. It is proved also that the subset AC of each of the spaces C, L_∞ (or M), and L_p is likewise an $F_{\sigma\delta}$ but no $G_{\delta\sigma}$, and that $CBV \subset L_p$ is both an $F_{\sigma\delta}$ and a $G_{\delta\sigma}$ but neither an F_σ nor a G_δ. The chief tool employed is a characterization of a G_δ in any metric space which runs roughly as follows: E is a G_δ if and only if no sequence $\{x_n\} \subset E$ which converges *rapidly enough* tends to a limit outside of E. For resolving questions of the sort here considered, the range of applicability of the methods mainly employed is by no means restricted to Banach spaces. (Received May 4, 1938.)

288. G. E. Albert: *Asymptotic forms for the generalized Legendre functions.*

Complete asymptotic forms for the functions $P_n{}^m(z)$ and $Q_n{}^m(z)$, n, m, and z complex, are derived under the following sets of conditions: (1) n is large, m is relatively moderate, and (a) z is exterior to some small neighborhoods (depending on n) of the critical points $z = \pm 1$, or (b) z is within such a neighborhood; (2) m is large, n is relatively moderate, and (a) $|z| < c|m|$, or (b) $|z| \geqq c|m|$, is valid for the smaller of the two indices in any bounded domain. The cases (1a) and (2a) are subject to Stokes' phenomenon; the discontinuities incurred are studied completely. The formulas developed corroborate all previously known results. The results for case (1b) are almost entirely new, only a few special cases of them having been studied before. Those for case (2b) are totally new. The method of the paper consists in an identification of the associated Legendre equation with a more general equation whose asymptotic solutions have been given by R. E. Langer in terms of elementary functions or Bessel functions. The interdependence of solutions leads to the calculation of the desired forms. (Received May 19, 1938.)