ABSTRACTS OF PAPERS

SUBMITTED FOR PRESENTATION TO THIS 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.

1. Professor W. L. Ayres: *On a certain neighborhood property.*

The paper considers metric spaces in which the frontier of every proper neighborhood contains at least one ordinary point. An open subset D such that the space contains a point not belonging to $\overline{D}$ is a proper neighborhood. After an examination of the properties of such spaces, the results are applied to obtain new characterizations of the arc and of the simple closed curve. (Received November 7, 1931.)

2. Mr. H. P. Thielman: *An integral addition theorem for Bessel functions.*

In this paper a new integral addition theorem for Bessel functions is derived. The results are obtained by means of a Volterra transformation and its inverse. (Received November 17, 1931.)

3. Dr. Gordon Pall: *On the application of a theta formula to representation in binary quadratic forms.*

It is shown that a certain method of Nazimoff's leads to the number of representations in ax^2+by^2, ab odd, only in the cases $a=1$, $b=1, 3, 5, 7$. Details are supplied for the case $a=1$, $b=7$. (Received November 23, 1931.)

4. Professor H. H. Germond: *A modification of Stirling's formula arising from an asymptotic evaluation of the Wallis integral.*

One method of deriving Stirling's approximation formula is to seek a function, y, whose derivative for each positive integer n is equal to the average rate of change of $n!$ in passing from $n-1$ to $n+1$. The asymptotic expression thus obtained is $y=C(n/e)^n(n+1)^{1/2}$. We determine C as follows. The integral $W(n)=\int_0^{\pi/2}\sin^n\theta d\theta$ has the value $(n!\pi/2)2^n(n/2)!^2$, when n is a positive even integer, and the value $(2^n[(n-1)/2]!^2/2)n!$ when n is a positive odd integer. Taking the geometric mean of $W(n)$ and $W(n+1)$ as a first approximation to the value of $W(n+1/2)$, we obtain a general asymptotic expression $W_1(n)=(\pi/(2n+1))^{1/2}$ for $n>0$. Replacing the factorials in the correct expression for W by the corresponding approximate expressions, and equating W to W_1 leads to a determination of C such that $y=(n/e)^n(2\pi(n+1/6))^{1/2}$. The values of y thus computed agree with the values of $n!$ to within one-half of one per