

of an ideal in a number field K as the set of all integral multiples in K of some algebraic integer which does not necessarily lie in K . In Chapter 10 it is demonstrated that every ideal can in fact be so described, the proof depending on the finiteness of the class number of a field. The application of algebraic number theory to the Fermat conjecture ($x^p + y^p = z^p$) is then discussed, on the basis of previous illustrative analysis of the cyclotomic field generated by the p th roots of unity. The last chapter presents the Minkowski proof of the Dirichlet theorem on the units of a number field. The material is well arranged, with frequent appropriate examples, and is self-contained except for the fundamental theorem of algebra, the theorem on symmetric functions, and the basic facts about simultaneous homogeneous linear equations.

The reviewer regrets that the author did not take a little additional space to point out the fascinating relations between the specific concepts arising in algebraic number theory and the more general concepts of algebra. Thus, the fact that an ideal is precisely the kernel of a homomorphism is not mentioned. A field means exclusively a field of numbers; hence the revealing circumstance that the congruence classes of integers modulo a prime ideal constitute a finite field cannot be brought out. In keeping with an ancient tradition in number theory, the word "group" is never mentioned, in the midst of numerous arguments of a group-theoretic character. The fact that the ideal classes form a group is thus not clearly stated, and the familiar argument that a subgroup of a free abelian group is free appears in disguise at least twice (for units, and for bases of an ideal).

This book provides a clear and elementary introduction to its subject, in keeping with the purpose of the Carus Monographs. If supplemented as indicated, it would be of use in elementary graduate courses.

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BRIEF MENTION

Collected mathematical papers. By G. D. Birkhoff. Vol. 1, 43+754 pp.; vol. 2, 8+983 pp.; vol. 3, 8+897 pp. New York, American Mathematical Society, 1950. \$18.00.

In addition to the collected papers, volume 1 contains obituaries by R. E. Langer, O. Veblen, and M. Morse, and volume 3 contains a list of Birkhoff's publications. The obituary by Morse, reproduced from Bull. Amer. Math. Soc. vol. 52 (1946) pp. 357-391, contains a detailed review of Birkhoff's work.

Contributions to Fourier analysis. By A. Zygmund, W. Transue, M.

Morse, A. P. Calderón, and S. Bochner. (Annals of Mathematics Studies, no. 25.) Princeton University Press, 1950. \$3.00.

The titles of the contributions are as follows. I, Localization of best approximation (Bochner); II, Dirichlet problem for domains bounded by spheres (Bochner); III, The Fréchet variation and Pringsheim convergence of double Fourier series (Morse and Transue); IV, Norms of distribution functions associated with bilinear functionals (Morse and Transue); V, Note on the boundary values of functions of several complex variables (Calderón and Zygmund); VI, On the theorem of Hausdorff-Young and its extensions (Calderón and Zygmund).

NEW PUBLICATIONS

- ALEKSANDROV, A. D. *Vypuklye mnogogranniki*. Moscow, Gosudarstvennoe Izdatel'stvo Tehniko-Teoreticeskoi Literatury, 1950. 428 pp.
- FORTET, R. *Calcul des probabilités. Centre d'études mathématiques en vue des applications*. Vol. 1. *Application des théories mathématiques*. Paris, Centre National de la Recherche Scientifique, 1950. 330 pp. 1200 fr.
- H. FREUDENTHAL, D. VAN DANTZIG, J. DE GROOT, B. L. VAN DER WAERDEN, A. VAN HEEMERT, G. HIRSCH, and J. C. H. GERRETSEN. *Zeven voordrachten over topologie*. Ed. by H. Freudenthal and W. Peremans. Gorinchem, Noorduijn, 1950.
- HILL, R. *The mathematical theory of plasticity*. Oxford, Clarendon, 1950. 9+356 pp.
- KAGAN, V. F. *Osnovaniya geometrii. Uchenie ob obosnovanii geometrii v hode ego istoričeskogo razvitiya*. Part 1. *Geometriya lobačevskogo i ee predistoriya*. Moscow, Gosudarstvennoe Izdatel'stvo Tehniko-Teoreticeskoi Literatury, 1949. 492 pp.
- LEVITAN, B. M. *Razloženie po sobstvennym funkciyam differencial'nyh uravnenii vtorogo porjadka*. Moscow, Gosudarstvennoe Izdatel'stvo Tehniko-Teoreticeskoi Literatury, 1950. 159 pp.
- MCLACHLAN, N. W. *Ordinary non-linear differential equations in engineering and physical sciences*. Oxford, Clarendon, 1950. 7+201 pp. \$4.25.
- MICHAEL, W. *Ortskurvengeometrie in der komplexen Zahlenebene*. Basel, Birkhäuser, 1950. 95 pp. 11.50 Swiss fr.
- SCHRÖDINGER, E. *Space-time structure*. Cambridge University Press, 1950. 8+119 pp. \$2.75.
- VAN DER WAERDEN, B. L. *Moderne Algebra*. Vol. 1. 3d ed. Berlin, Springer, 1950. 8+292 pp. 27 DM.