The November Meeting in Los Angeles, California
November 17, 1962

595-1. DONALD MONK, University of Colorado, Boulder, Colorado. On finite dimensional cylindric algebras. Preliminary report.

Theorem 1. A CA_α generated by a set P such that, for each $p \in P$, Δp has at most one element, is representable. Corollary. A prime CA_α, i.e., a CA_α generated by the empty set, is representable. Both the theorem and the corollary apply to polyadic equality algebras, and the theorem is valid also for polyadic algebras without equality. For α finite and greater than 2, all of these results are new. Theorem 2. If a CA_α can be neatly embedded in a $CA_{\alpha+2}$, then it can be embedded in a polyadic equality algebra. Theorem 3. Any transformation algebra (or transformation equality algebra) is isomorphic to a sub-direct product of 0-valued functional transformation algebras (with the functional equality). (Received July 30, 1962.)

595-2. A. L. WHITEMAN, University of Southern California, Los Angeles 7, California. A theorem analogous to Jacobsthal's theorem.

It is well known that an odd prime p can be represented in the form $c^2 + 2d^2$ if and only if $p = 8k + 1$ or $p = 8k + 3$. In a recent paper Brewer [Trans. Amer. Math. Soc. 99 (1961), 241-245] has expressed c in terms of the sum $B = \sum_{u=0}^{p-1} \chi((u + 2)(u^2 - 2))$, where $\chi(n)$ is the quadratic character of n modulo p. His precise result may be stated as follows. Theorem. The sum B satisfies $B = 0$ if $p \neq c^2 + 2d^2$ and $B = 2c$ if $p = c^2 + 2d^2$, the sign of c being determined by the congruence $c \equiv (-1)^{k+1} \pmod 4$. Brewer's method of proof makes essential use of the following congruences. If $p = c^2 + 2d^2$ ($c \equiv (-1)^{k+1} \pmod 4$), then $2c \equiv -\binom{4k}{k} \pmod p$ when $p = 8k + 1$, and $2c \equiv \binom{4k+1}{k} \pmod p$ when $p = 8k + 3$. The first congruence is due to Stern [J. Reine Angew. Math. 32 (1846), 89-90]; the second is due to Eisenstein [J. Reine Angew. Math. 37 (1848), 97-126]. In this paper a direct proof of Brewer's theorem is given from which the congruences of Stern and Eisenstein follow easily as corollaries. (Received September 12, 1962.)

595-3. E. O. THORP, New Mexico State University, University Park, New Mexico. Two characterizations of finite dimensional normed spaces.

Let X be a normed linear space. The following statements are equivalent. 1. X is finite dimensional. 2. X is closed under any continuous linear map with range a normed space. 3. Whenever $\{M_a\}_{a \in A}$ is a collection of nested dense linear manifolds, $\bigcap_{a \in A} M_a$ is dense in X. (Received September 21, 1962.)

595-4. H. N. GUPTA, University of California, Berkeley 4, California. On independence of Tarski's axiom system for geometry. Preliminary report.

In his article, What is elementary geometry? (The Axiomatic Method, Amsterdam, 1959,