respectively. The functions are interpolatable in the regions tabulated, and second central differences are provided.

Y. L. L.

31[9].—ALAN FORBES & MOHAN LAL, *Tables of Solutions of the Diophantine Equation* $x^2 + y^2 + z^2 = k^2$, Memorial University of Newfoundland, St. John's, Newfoundland, Canada, July 1969, x + 200 pp.

Table 2 lists all solutions $0 < x \leqq y \leqq z$ for all $k = 3(2)701$. Table 1 lists the number of such solutions, for each k, and the number of primitive solutions. These tables are an extension of an earlier table [1] which went to $k = 381$. (See the earlier review for more detail.)

The introduction here reports a few errors in the earlier table [1].

In the earlier review I noted that (empirically) if k is a prime p, written as $8n \pm 1$ or $8n \pm 5$, then there are exactly n solutions here. Here is a proof: By Gauss, (see *History of the Theory of Numbers* by L. E. Dickson, Vol. 2, Chapter VII, Item 20) the number of proper (that is, primitive) solutions of $m \equiv 1 \pmod 8$ as

$$m = x^2 + y^2 + z^2,$$

counting all possible permutations and changes of sign, and allowing x, y, or z to be 0, is

$$3 \cdot 2^{\mu+2} H,$$

where m is divisible by μ primes, and H is the number of properly primitive classes of binary quadratic forms of determinant $-m$ that are in the principal genus. For $m = p^2$, this becomes

$$6(p - (-1/p)) \tag{1}$$

proper solutions.

Each solution

$$p^2 = 0^2 + x^2 + y^2 \tag{2}$$

is counted 24 times by Gauss, but is omitted here. Each solution

$$p^2 = x^2 + x^2 + y^2 \tag{3}$$

is counted 24 times by Gauss and once here. Each solution

$$p^2 = x^2 + y^2 + z^2$$

is counted 48 times by Gauss and once here. Now examine

$$p = 8n \pm 1 \quad \text{and} \quad p = 8n \pm 5$$

separately, and allowing for the value of $(-1/p)$ in (1), and whether representations (2) and (3) do or do not exist, one finds that the $6(p - (-1/p))$ counts of Gauss become a count of n here in all four cases. Neat.

D. S.

1. MOHAN LAL & JAMES DAWE, *Tables of Solutions of the Diophantine Equation* $x^2 + y^2 + z^2 = k^2$, Memorial University of Newfoundland, St. John's, Newfoundland, Canada, February 1967. (See *Math. Comp.*, v. 22, 1968, p. 235, RMT **23**.)