and so on. I do not remember seeing a proof, but I think $2^{n-1}-1$ is never divisible by n^2. Are there other such cases?

If, on the other hand, n be given, there are $n-2$ distinct values (besides 1) of m_s for which

$$(m_s+kn^s)^{n-1}$$

is divisible by n^s for all integral values of k. Any one of them may be thus determined. Let m_1 be any integer in the limits

$$1 < m_1 < n.$$

Then $$m_1^{n-1}=1+\mu n+\mu' n^2,$$

where $$0 \not> \mu \not> n-1.$$

Let $$m_1^{n-2}=\lambda+\lambda' n,$$

where $$1 < \lambda < n,$$

then $$(m_1+\kappa n)^{n-1}=m_1^{n-1}+m_1^{n-2}.\kappa n(n-1)+\text{a multiple of } n^2$$
$$=1+(\lambda-\kappa\mu)n+\text{a multiple of } n^2.$$

Hence $(m_1+\kappa n)^{n-1}$ is divisible by n^2, if and only if $\lambda-\kappa\mu$ is divisible by n, *i.e.* if

$$\lambda\mu^{n-2}-\kappa\mu^{n-1} \text{ is divisible by } n,$$

or if $$\lambda\mu^{n-2}-\kappa \text{ is divisible by } n.$$

Thus if κ is the remainder in dividing $\lambda\mu^{n-2}$ by n and $m_2=m_1+\kappa n$, then $(m_2+kn^2)^{n-1}$ is divisible by n^2, and there are therefore (excluding units) $n-2$ distinct values of m_2 corresponding to the different values of m_1.

It is obvious that if m_2 satisfy this condition, so do $m_2^2, m_2^3 \dots m_2^{n-2}$. But if M_1 be a primitive root of n [*i.e.* if $n-1$ be the smallest value of m for which M_1^m-1 is divisible by n], and M_2 the corresponding value of m_2, then $M_1, M_1^2, \dots M_1^{n-2}$ on division by n must leave the remainders 2, 3, ... $(n-1)$ in some order: so too must $M_2, M_2^2, \dots M_2^{n-2}$. Hence, we may take for our set of distinct solutions the remainders on dividing $M_2, M_2^2, \dots M_2^{n-2}$ by n^2.

Just as m_2 (or M_2) was determined from m_1 (or M_1), so may m_3 (or M_3) be determined from m_2 (or M_2), and so on in succession. W. E. H.

254. [**V. 1. a.**] "*Approximately equal to.*"

I should like to suggest the use of a broken sign of equality ╤ for "approximately equal to."

Thus, I should write

$$\tan\theta = \tfrac{52}{1500} ╤ \tfrac{1}{30}, \text{ whence } \theta ╤ 2^\circ.$$
$$x = \sqrt{2}-1$$
$$╤ \cdot 41.$$

The sign is a long and short ╤, with a slight tick at the end of the short to avoid confusion with a hastily written =. C. S. J.

255. [**K. 8.**] Let A, B, C, D be the vertices of a quadrilateral; EFG its diagonal triangle. L, L', M, M', N, N' the mid points of AC, BD, AB, DC, DA, CB respectively; efg the median triangle of the triangle EFG.

It is a defect in all our text-books to exhibit the collinearity of $LL'e$ and to ignore the collinearities of $MM'g$ and $NN'f$.

The four points A, B, C, D give rise to three quadrilaterals, the pairs of diagonals being (AC, BD); (AB, CD); (AD, BC).

Students are apt to think that LL' possesses some special property not shared by MM', NN'. W. GALLATLY.

256. [**K. 6. a; 13. c.**] *On the area of a triangle, the equations of whose sides are given.*

Let the sides be

$$a_1x+b_1y+c_1=0, \quad\dots\dots(1)$$
$$a_2x+b_2y+c_2=0, \quad\dots\dots(2)$$
$$a_3x+b_3y+c_3=0, \quad\dots\dots(3)$$

and let (1) contain the vertices (x_2y_2), (x_3y_3), and similarly for the others.