

979
978

(Jan.-Feb.

1954)

PROBLEMS AND QUESTIONS

157

$$\frac{p+2}{2} = k$$

find that $p = 14/11$.
Thus we have the

1331

City College.

in the form $x^3 - 3ab$
giving substitution
reduces the equation
is equation has no
ion.

$(a+b) = 0$ may have
last equation does

$$(u^2 + 3v^2) = 1,$$

$$2)^2 = (u - 3v).$$

$1 = 0$, or

a trivial solution
12, $m = 18$, $a = 3$,
ons of (2), namely,
 k is an integer.

stitute of Brooklyn.

anston, Illinois.

are odd primes has
ugh 17 as follows:

p	3	5	7	11	13	17
p'	3	11	43	683	2731	43691

Are there solutions of the equation for $p > 17$?

Solution by Sam Kravitz, East Cleveland, Ohio. From Lehmer's List of Primes it can be verified that when $p = 19$; $p' = 174,763$ and for $p = 23$, $p' = 2,796,203$ we have prime solutions for the equation.

Also solved by C. W. Trigg, Los Angeles City College who pointed out that Lucas stated (Assoc. franc. avanc. sc, 15, 1886, II, 191-2) that if n and $2n+1$ are primes then $2n+1$ is a factor of $2^n + 1$ when $n \equiv 1 \pmod{4}$. In fact $2^{29} + 1 = 536,870,913 = (3)(59)(3,033,169)$ so p' is not prime for $p = 29$.

Editor's Note: D. H. Lehmer, University of California, Berkeley, has indicated that the following table gives all the known primes p' of the form $p' = (2^p + 1)/3$ where p is prime.

978 $\rightarrow$	p	p'	$\leftarrow$ 979
	3	3	
	5	11	
	7	43	
	11	683	
	13	2731	
	17	43691	
	19	1 74763	
	23	27 96203	
	31	7 158 27883	
	43	293 20310 07403	
	61	7 68 61433 64045 64651	
	79	2014 87636 60243 81957 84363	

The large prime $(2^{79} + 1)/3$ is due to A. Ferrier, MTAC v.4, 1950 p. 54.

QUICKIES

From time to time this department will publish problems which may be solved by laborious methods, but which with the proper insight may be disposed of with dispatch. Readers are urged to submit their favorite problems of this type, together with the elegant solution and the source, if known.

Q 103. If $\cos 17A = f(\cos A)$, then $\sin 17A = f(\sin A)$. [Submitted by Norman Anning.]