

## Some interesting properties about some prime numbers

by Manjil Saikia - Thursday, January 05, 2012

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### OBSERVATION I:

You know the definition of prime numbers. Now I am going to tell you some interesting properties about some prime numbers. I observe that there are only three primes having two digits which are also consecutive, have a special property. When I added the digits of the three primes, I found that these are actually in powers of one prime where the power increases by one in each number. These numbers are 11, 13 and 17.

For 11, the sum of the digits is  $2=2^1$ .

For 13, the sum of the digits is  $4=2^2$ .

For 17, the sum of the digits is  $8=2^3$ .

Till now, I could not find whether there are other consecutive primes with this property in three or more digits or are there infinitely many primes with this property?

### OBSERVATION II:

Now how to express a prime in terms other primes; when I thought about this, I observed some results from which I can express every prime in terms of some other primes. This time I take some exception. I took a set say  $A=\{x: x \text{ is ~ a ~ prime}\} \cup \{1\}$  and another set  $P=\{x: x \text{ is ~ odd ~ prime}\}$ . Now if we take an element from the set  $P$ , it can be expressed as a sum of distinct elements from the set  $A$ . I take some examples and found that this observation is correct.

For example,  $3=1+2$ ,  $5=2+3$ ,  $7=2+5$ ,  $11=1+3+7$ ,  $17=13+3+1$ ,  $19=17+2$ ,  $23=17+5+1$ ,  $29=23+5+1$ ,  $31=29+2$ , etc.

Now question is, is there any element in  $P$  which can not be express as a sum of distinct elements from the set  $A$  or if the observation is correct for all the elements in  $P$ , then how to prove it. Till now I could not find any element in  $P$  which can not be express as a sum of distinct elements from the set  $A$  or if it is true then how to prove it.

- Zakir Ahmed, Research scholar, Department of Mathematical Sciences, Tezpur University.

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