

## The Four 4's Puzzle

I have done this puzzle throughout the years with many of my classes. The object of the exercise is to see if you can write all the numbers from 1 to 100 as an arithmetic expression of four 4's. Each time you can only use the number "4", and you must always use four of them. You can use them with any arithmetic operator, "+, -, x, ÷, exponents, roots, and so on". Here are a couple of examples:

(1) =  $\frac{4+4}{4+4}$ , or  $\frac{4 \times 4}{4 \times 4}$ , or  $\frac{44}{44}$  So you can use two of your 4's to make the number "44", and there is usually more than one way that you can get the answer.

(2) =  $\frac{4^{\sqrt{4}}}{4+4}$  Here you can see how roots and exponents can be used, and  $4^2 = 16$ , and  $16 \div 8 = 2$ .

Now, since  $.4 = \frac{4}{10}$ , then  $\frac{4}{.4} = 4 \div \frac{4}{10} = 4 \times \frac{10}{4} = 10$ . And since  $\overline{.4} = \frac{4}{9}$ , then  $\frac{4}{\overline{.4}} = 4 \div \frac{4}{9} = 4 \times \frac{9}{4} = 9$ . This may

be hard to read, so I will write it this way:  $4 \div \overline{.4} = 4 \div \frac{4}{9} = 4 \times \frac{9}{4} = 9$ . Now put the two together and we get:

$$(19) \frac{4}{.4} + 4 \div \overline{.4} = 10 + 9 = 19$$

So, I have given you three of the answers: (1), (2) and (19). Can you get the remaining 97? What you will find is that a lot of the answers come in pairs with one containing a plus sign and the other, a subtract sign. You will also find that the higher prime numbers, such as 87, 89, and so on are harder to get. Have fun!

## Answer to last week's puzzles

Puzzle: Here is a little rhyme.

"Brothers and Sisters have I none,  
But THAT MAN'S father is my father's son."

Who is "THAT MAN"

I will write the second line as an equation:

THAT MAN'S father = my father's son.

Now, I will solve the right hand side first, and I get that I am my father's son since I have no brothers (or sisters). Thus, the equation now looks like this:

THAT MAN'S father = me

Now, the equation is easy to solve, you must be looking at your own son. So "THAT MAN" is your son.

The second puzzle's answer will come in a day or so, as I am short on time right now.