Problem of the Week
Solution Seven

In a certain population, 85% **of the people do math,** 80% **of the people play chess,** 75% **of the people read mysteries, and** 70% **of the people own cats. What is the minimum percentage of the population that engages in all four activites?**

SOLUTION: The minimum percentage is 10%.

It will simplify things to assume there are exactly 100 people in the population. Then 85 of them do math and 80 play chess. If we assume that all 15 of the non-math-doers are chessplayers, that still leaves 65 people who do math and also play chess. We also know there are 75 people who read mysteries. Even if this number includes all 35 of the people who either do not do math or do not play chess, we would still have 40 people who do all three. Applying this argument one more time, we note that there are 70 people who own cats. Even if this number includes all 60 people who fail to do at least one of the previous three activities, we are still left with 10 people who do all four. That is why the answer is 10%.

The general formula is now clear. Regardless of how many activities you want to consider, the answer is found by adding up all the percentages, and then subtracting one hundred times one less than the number of activities. For example, in this case the sum of the percentages is $85 + 80 + 75 + 70 = 310$, and we subtract 300 to get 10.

Incidentally, a common seven-letter word with three u's in it is "unusual." A word with the sequence ADAC in it is "headache." If you did not come up with those, I urge you to reread my original statement of the puzzle. I think you'll find I gave you a rather big hint.