Answer to puzzle, Uke 17

A lot of trial and error is needed, and, although there are ways to help limit the set of possibilities, there isn't a surefire method of arriving at a solution in a reasonable amount of time with a pen and paper.

To start with, we might notice the first two digits make the number 98, which is quite close to 100. So, if we can add and subtract the rest of the single digits to make 2, then we'll have 100. In fact, there are eight ways to do this:

98 + 7 + 6 - 5 - 4 - 3 + 2 - 1

98 + 7 - 6 + 5 - 4 + 3 - 2 - 1

98 + 7 - 6 + 5 - 4 - 3 + 2 + 1

98 + 7 - 6 - 5 + 4 + 3 - 2 + 1

98 - 7 + 6 + 5 + 4 - 3 - 2 - 1

98 - 7 + 6 + 5 - 4 + 3 - 2 + 1

98 - 7 + 6 - 5 + 4 + 3 + 2 - 1

98 - 7 - 6 + 5 + 4 + 3 + 2 + 1

But we can do better—we can make 100 with fewer than 7 pluses and minuses. Here's one way to make sure we find all possibilities: Use a computer simulation. Each pair of digits can be connected by either nothing, a plus sign, or a minus sign. Since there are eight paired connections, there are **3^8 = 6,561** possible combinations of pluses and minuses. I simulated each one of these combinations to determine which sum to 100.

The simulation unearthed that there are seven other ways of making 100:

98 - 7 - 6 - 5 - 4 + 3 + 21

9 + 8 + 76 + 5 + 4 - 3 + 2 - 1

9 + 8 + 76 + 5 - 4 + 3 + 2 + 1

9 - 8 + 76 + 54 - 32 + 1

9 - 8 + 76 - 5 + 4 + 3 + 21

9 - 8 + 7 + 65 - 4 + 32 - 1

98 - 76 + 54 + 3 + 21

The bolded solution is the winner. It uses only four pluses and minuses!

The computer simulation also revealed that it's possible to make every number from 1 to 100, which could keep you doodling for many meetings. (In fact, it's possible to make every number *in more ways than one* with one notable exception: 9 + 87 - 65 + 4 - 32 - 1 is the unique way to make 2.)