Problem of the Week
Number Three
February 8, 2016

A company has advertised for a senior position, inviting applications from college graduates in any discipline. The only requirement is that the applicant must show a reasonable level of numeracy. A short list is drawn up and the finalists are brought in for interviews. Each is asked, "How much is $1 + 1$?"

The first candidate is a physicist. She replies, "It's around two." The second candidate is a mathematician. He thinks for a moment and then says, "It depends on the base. It we're working in base two then the answer is one-zero. In any other base the answer is two." Then comes an engineer. She reaches for her calculator, taps on the keys, and replies, "It's 2.0000."

Next is a philosopher. He says, "The answer depends on what you have in mind when you say 'one'. Is it simply the interaction of the gestalt of a set consisting of a sole member with a similar set, or is there an intrinsic acquisition of quality involved, which transcends the mere quantitative nature of each of the two sets? For if you put one apple together with another apple on a table, you get two apples; but if you make one river join with another river, then the result is still one, albeit bigger river."

The next candidate is a statistician. She says, "With a confidence level of $.95$, the answer is two." Next up is a lawyer who replies, "According to Smith v. Jones (1976), the answer is two. However, if you want that in writing, then I'll have to add my bill for correspondence and incidentals to it, and the total increases to $5{,}002$. Dollars, of course."

The final candidate is an accountant. He is asked, "How much is $1 + 1$? The accountant peers into the panel members' eyes, quietly goes to the door, opens it, looks right and then left, closes the door carefully, walks back to the panel, and, bending forward, whispers, "How much would you like it to be?"

The accountant got the job.

Here's this week's problem:

What is the sum of the digits in the number that is equal to the product:

$$11 \times 101 \times 10{,}001 \times 100{,}000{,}001 \times 10{,}000{,}000{,}000{,}000{,}001$$

When you think you have the problem figured out, follow the instructions below.

*Submissions are due to Jason Rosenhouse by 5:00 on **Friday, February 12.**. Solutions should be written on the back of an official POTW handout. Place your name, e-mail address, and the section numbers and professors of any math courses you are taking, in the **upper right corner** of the front of the page. One weekly winner will receive a five-dollar gift card from Starbucks. Solutions will be posted at this website, by the Monday after the problem is due:*

http://educ.jmu.edu/∼rosenhjd/POTW/Spring15.html