1. The US GDP is over 16 trillion dollars. Shouldn't citizens know what this means?

- one hundred = 100 = \(10^2\)
- five hundred = 500 = \(5 \times 10^2\)
- two thousand = 2,000 = \(2 \times 10^3\)
- ten thousand = 10,000 = \(10^4\)
- one hundred billion = 100,000,000,000 = \(10^{11}\)
- one trillion = 1,000,000,000,000 = \(10^{12}\)

2. Let's remind students that they have a fine calculator in their very own brain. Students can see that \((2 \times 7) \times (2 \times 7)\) has to be the same as \((2 \times 2) \times (7 \times 7)\). I'm not too concerned if they're not fluent in the technical reasons; no one used to expect those from kids. (Nowadays they may get exposed to the commutative and associative rules -- also called properties or axioms. Essentially these mean, respectively, that rearranging the numbers in a product doesn't change the result and neither does changing the order in which the multiplications are done. The above scrambling of the 2's and 7's actually requires several such steps. I suggest you not get bogged down in all that.)

In the second line, \(4 \times (50 - 1) = 4 \times 50 - 4 \times 1\) is again something that most students can see. (Again, there is precise terminology. This is an example of distributivity; that is, you can distribute multiplication over addition or over subtraction.) On the right-hand side it's important to realize, as many students do not, that the multiplications must be carried out before the subtraction. (That's called precedence; that is, multiplication has greater precedence than subtraction.)

The last step can be done by counting backwards from 200 down to (first) 199, then 198, 197, and (4th and last) to 196.

3. This problem hints at the huge number of everyday applications of probability. There are 3! = 3 \(\times 2 \times 1 = 6\) possible orderings of people named A, B and C (short for Atieno, Bao, and Chimayi). Here they are, in alphabetical order:

ABC   ACB   BAC   BCA   CAB   CBA

Let's think of tasks a, b, and c as humming the musical notes a, b, and c, respectively. Here's a picture of the possible assignments:

\[
\begin{array}{cccccc}
ABC & ACB & BAC & BCA & CAB & CBA \\
abc & abc & abc & abc & abc & abc \\
\end{array}
\]

In the first case, all three people hum their own initial; in the second one, only A does so; in the third, only C does; in the last one, only B does. Match-ups (of a person's initial to task assigned) are underlined. That leaves BCA and CAB as the only two cases with no match-up. So the stated condition is satisfied in just these 2 cases out of 6. The problem states that all 6 orderings are equally probable, so the probability is \(2/6\) which equals \(1/3\).

Problem too hard? Let your student skip it or replace "three" by "two" and leave out "Chimayi." Too easy? She/he can replace "three" by "four" and add Daniele.