Hi, I'm Greg. I'm a NYC tutor! I love helping students. I tutor many subjects, assist with homework help, etc. I mainly specialize in specialized tests.

As it turns out, I haven't been able to get to do as many livestreams as I have in past years (yet, hopefully that changes). Therefore, I thought it would be fun to start a Problem Of The Day Series. I will put up a problem and leave it running for a while. You guys will then analyze it, and come up with possible solutions and alternative solutions on your own. I'll eventually post the answer in some manner.

For now we'll play it by ear how that will happen and for how long I'll leave up a problem. But right now I'm thinking of keeping the problem up maybe 2 hours minimum and maybe even in some cases 4 or 5 hours depending upon the dynamics and my situation. Unlike my AMA (Ask Me Anything) lifestream sessions, I will not be checking in every few minutes although I may from time to time join into the discussion. Again, the idea is for you guys to discuss out the problem.

Please be respectful to each other in this endeavor and let's make this fun, educational and forward-thinking. Keep the comments within the spirit of what I'm doing here. Please email me at GregsTutoringNYC@gmail.com if needed.

HERE'S THE PROBLEM: <———
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Round 199.9 times 1999 to the nearest unit.

A) 400000 B) 399000 C) 399800 D) 399700 E) 399600

NOTE: You (should) all know how to solve this question.
      But can you do it correctly the first go through?
      Can you solve it in under 30 seconds?

HERE'S THE SOLUTION:
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If we want an estimate we can round up and have 200 x 2000 = 400000. But the answers choices given are too close together so we have to go a step further.

The most obvious knee-jerk approach is to just do the multi-digit multiplication, as we can round up or down once we get the product:

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    199.9
   x 1999
   ------
    17991
   17991
  17991
 + 1999
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  3996001 accommodating the decimal point yields 399600.1 rounded is    Choice E
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That computation is error prone, tedious, and wastes time.

We can also look at this problem logically. If 1999 is one less than 2000 that's 1/2000 less than the product therefore 400000/2000 = 200 less overall. Similarly if 199.9 is .1 less than 200 that's .1/200 less than the product. Well .1/200 is also the same as 1/2000 which we just computed therefore that's 200 less overall too. So we have 400000 - 400 = 399600.

Note that in the computations in the previous paragraph we approached as 1999x200 and 199.9x2000 so we took too much away. We need to add back 1/2000 x 1/2000 = 1/4000000 = 0.00000025 and that multiplied by 400000 is .1 The answer choices don't care about a value that small.

Lastly, it seems the logical solution got somewhat carried away itself. Turns out that it

is actually accommodated mathematically/symbolically via the distributive property/FOIL.

This can apply to the problem at hand, that is, we see that

    199.9 is the same as 200 − .1
    1999 is the same as 2000 − 1

.: (200 − .1)(2000 − 1) = 200x2000 + 200x(−1) + (−.1)x2000) + (−.1)(−1)
                        = 400000 −200 −200 + .1
                        = 399600.1 rounded is   Choice E

Use the math you know to your advantage! Once you see the FOIL you can often solve this
problem in your head.

− Greg / GregsTutoringNYC@gmail.com   LLAP ⊕