2021 Fall AMC 12B Problems/Problem 1

The following problem is from both the 2021 Fall AMC 10B #1 and 2021 Fall AMC 12B #1, so both problems redirect to this page.

Contents

Problem

What is the value of $1234 + 2341 + 3412 + 4123$?

$\textbf{(A)}\ 10{,}000 \qquad \textbf{(B)}\ 10{,}010 \qquad \textbf{(C)}\ 10{,}110 \qquad \textbf{(D)}\ 11{,}000 \qquad \textbf{(E)}\ 11{,}110$

Solution 1

We see that $1, 2, 3,$ and 4 each appear in the ones, tens, hundreds, and thousands digit exactly once. Since $1 + 2 + 3 + 4 = 10$, we find that the sum is equal to

$$10 \cdot (1 + 10 + 100 + 1000) = \boxed{\textbf{(E)}\ 11{,}110}.$$

Note that it is equally valid to manually add all four numbers together to get the answer.

~kingofpineapplz

Solution 2

We have

$$1234+2341+3412+4123 = 1111\,(1 + 2 + 3 + 4) = \boxed{\textbf{(E)}\ 11{,}110}.$$

~Steven Chen (www.professorchenedu.com)

Solution 3

We see that the units digit must be 0, since $4 + 3 + 2 + 1$ is 0. But every digit from there, will be a 1 since we have that each time afterwards, we must carry the 1 from the previous sum. The answer choice that satisfies these conditions is $\boxed{\textbf{(E)}\ 11{,}110}$.

~~stjwyl

Video Solution by Interstigation

https://youtu.be/p9_RH4s-kBA

See Also

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Preceded by **First Problem**	Followed by **Problem 2**
1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • 10 • 11 • 12 • 13 • 14 • 15 • 16 • 17 • 18 • 19 • 20 • 21 • 22 • 23 • 24 • 25	
All AMC 10 Problems and Solutions	

2021 Fall AMC 12B (**Problems** • **Answer Key** • Resources (http://www.artofproblemsolving.com/community/c13))	
Preceded by **First Problem**	Followed by **Problem 2**
1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • 10 • 11 • 12 • 13 • 14 • 15 • 16 • 17 • 18 • 19 • 20 • 21 • 22 • 23 • 24 • 25	
All AMC 12 Problems and Solutions