2021 Fall AMC 12B Problems/Problem 4

The following problem is from both the 2021 Fall AMC 10B #5 and 2021 Fall AMC 12B #4, so both problems redirect to this page.

Contents

- 1 Problem
- 2 Solution 1
- 3 Solution 2
- 4 Video Solution by Interstigation
- 5 See Also

Problem

Let $n = 8^{2022}$. Which of the following is equal to $\frac{n}{4}$?

$\textbf{(A)}\ 4^{1010} \qquad \textbf{(B)}\ 2^{2022} \qquad \textbf{(C)}\ 8^{2018} \qquad \textbf{(D)}\ 4^{3031} \qquad \textbf{(E)}\ 4^{3032}$

Solution 1

We have

$$n = 8^{2022} = \left(8^{\frac{2}{3}}\right)^{3033} = 4^{3033}.$$

Therefore,

$$\frac{n}{4} = \boxed{\textbf{(E)}\ 4^{3032}}.$$

~kingofpineapplz

Solution 2

The requested value is

$$\frac{8^{2022}}{4} = \frac{2^{6066}}{4} = \frac{2^{6066}}{2^2} = 2^{6064} = \boxed{\textbf{(E)}\ 4^{3032}}.$$

~NH14

Video Solution by Interstigation

https://youtu.be/p9_RH4s-kBA?t=429

See Also

2021 Fall AMC 10B (**Problems** • **Answer Key** • Resources (http://www.artofproblemsolving.com/community/c13))	
Preceded by **Problem 4**	Followed by **Problem 6**
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 **Problem 3**	Followed by **Problem 5**
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	

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