

To solve this problem, we evaluate the expression step-by-step using basic limit principles and the algebraic laws of exponents. We start by focusing on the fraction located within the exponent: $\frac{1}{\infty}$. In mathematics, dividing a constant value by a number that grows infinitely large causes the total value of the fraction to shrink closer and closer to zero. Therefore, we utilize the foundational identity that $\frac{1}{\infty} = 0$.

Substituting 0 back into the exponent simplifies our original expression from $y^{\frac{1}{\infty}}$ to y^0 . According to the Zero Rule of Exponents, any non-zero base raised to the power of zero is mathematically defined to be exactly equal to 1. This holds true regardless of the value of the variable base y (provided $y \neq 0$).

Thus, the expression cleanly evaluates to 1, therefore **the correct Answer is 1**

CALCULATOR TIPS:

You can easily solve or verify this problem on your scientific calculator by choosing random values for your variables to simulate infinity and the base y .

1. Assign a standard number to the base y (for example, let $y = 5$).
2. Substitute a very large number in place of infinity (∞) to simulate an endless value, such as 1×10^9 or simply a string of nines (999999).
3. Type the expression into your calculator layout screen: $5^{\frac{1}{999999}}$.
4. Press =, and the calculator will display **1** (or a number incredibly close to it, like 1.000001, which rounds perfectly to 1).

The only scenario where this expression wouldn't immediately equal 1 is if the problem specified that the base y also approaches infinity at the same time, which would create the indeterminate power form ∞^0 .