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Antilog is the mathematical operation that is the inverse of the logarithm. If given a logarithmic value, the antilog returns to the original value of the function before taking the logarithm. It is also called the exponential function because it is also the inverse of the logarithm.

The concept of anti-log has its roots in the development of logarithms in the 17th century. The term for antilog (antilogarithm) was first used by the mathematician John Wallis in his 1685 book “A Treatise of Algebra”.

The use of antilog is an important part of mathematical and scientific calculations, especially in fields that deal with exponential functions, such as finance, and engineering.

In this article, we will discuss the definition, properties, how to calculate antilog, and a better understanding of the concept of antilog solving different examples.

Antilog Definition:

"Antilog is the inverse operation of the logarithm function. It is a mathematical function that takes the logarithm of a number and returns the original number." It is also known as the Anti-logarithms of the function.

On the other hand, if "x" is the logarithm of a number y with base "d", then "y" is the antilog of "x" with the base "d". It is defined by.

If $\log_d y = x$ Then, $y = \log_d^{-1}(x)$

Antilog is used in various fields of mathematics, science, and engineering, especially in applications involving exponential functions and logarithmic scales. They are particularly useful in calculating values in real-world situations, such as converting decibel measurements to voltage ratios in electronics or determining pH levels in chemistry.

How to calculate the Antilog:

To calculate the antilog first we know the knowledge about the characteristic and the mantissa part of the number. In a logarithmic system, a number is expressed as the sum of two parts: the characteristic and the mantissa. The characteristic represents the integer part of the logarithm, while the mantissa represents the fractional part of the logarithm.

For example: In the logarithmic notation of the number 1234.56 with base 10. The characteristic is the integer part of the logarithm: $\log_{10}(1234) = 3$

The mantissa is the fractional part of the logarithm: $\log_{10}(1.23456) = 0.0915$

The combination of the characteristic and mantissa is known as the logarithmic value of the number. The logarithmic value of 1234.56 with base 10 is 3.0915.

To calculate the antilog, use the following formula:

$$\log_b^{-1}(x) = b^y$$

Where “b” is the base of the logarithm and “y” is the logarithmic value. The steps to calculate the antilog are following:

- **Recognize the base of the logarithm**. The base is usually written as a subscript next to the logarithm symbol. For example, $\log_{10}$ (100), the base is 10.
- **Identify the logarithmic value**. This is the value that is given to you, either as a decimal or a fraction. For example, in $\log_{10}$ (100), the logarithmic value is 2.
- **Substitute the values into the formula for the antilog**. In the example above, the antilog of $\log_{10}(100)$ can be calculated as: $\log_{10}^{-1}(2) = 10^2 = 100$

The antilog of $\log_{10}$ (100) is equal to 100.

> **Note:** If the logarithmic value is negative, the antilog will be between 0 and 1. If the logarithmic value is positive, the antilog will be greater than 1.

Example:

In this section, we discussed the different examples of the antilog to understand the concept of antilog in detail.

Example 1:

Find the antilog of $\log_{10}(32)$.

Solution:

Step 1: First, Let the function is equal to y.

$y = \log_{10}(32)$

Step 2: note the base of a given value.

By the above relation note that, the base of $\log_{10}(32)$ is “10”.

Step 3: Find the log of the given value with base 10.

$y = \log_{10}(32) = 1.5051$

Step 4: write the formula of antilog.

$$\mathbf{\log_b^{-1}(y) = b^y}$$

Where “b” is the base of the logarithm and “y” is the logarithmic value.

Step 5: put the values in the above formula carefully.

$b = 10$, $y = 1.5051$, $x = 1.5051$

$\log_{10}^{-1}(1.5051) = 10^{1.5051}$ or 10^{32}

$\log_{10}^{-1}(1.5051) = 32$

$\log_{10}^{-1}(1.5051) = 32$ is the antilog of the $\log_{10}(32)$.

The above problem of base 10 can be solved with the help of antilog calculator base 10 by substituting the antilog value.

Example 2:

Find the antilog where the logarithmic value is 2 with a base of 10.

Solution:

Step 1: write the given data from the question.

$y = \log_{10}(x) = 2$

Now, we find the value of x.

Step 2: Identify the base of a given value.

base of logarithm = b = 10, y = log (x) = 2

Step 3: Write the antilog formula.

$\log_b^{-1}(x) = b^y$

Where "b" is the base of the logarithm and "y" is the logarithmic value.

Step 4: put the values from step 2 in the above formula carefully.

$\log_{10}^{-1}(2) = 10^2$

$\log_{10}^{-1}(2) = 10 \times 10$

$\log_{10}^{-1}(2) = 100$

$\log_{10}^{-1}(2) = 100$ is the antilog of the logarithmic value 2 with a base of 10.

Example 3:

If the log with base 10 of y is 3.5, what is "y" or an antilog of 3.5?

Solution:

Step 1: write the given data from the question.

$\log_{10}(y) = 3.5$

Step 2: Identify the base of a given value.

base of logarithm = b = 10, y = log (y) = 3.5

Step 3: Write the antilog formula.

$\log_b^{-1}(x) = b^y$

Where "b" is the base of the logarithm and "y" is the logarithmic value.

Step 4: put the values from step 2 in the above formula carefully.

$\log_{10}^{-1}(3.5) = 10^{3.5}$

$\log_{10}^{-1}(3.5) = 3162.28$

y = 3162.28

$\log_{10}^{-1}(3.5) = 3162.28$ is the antilog of the logarithm of 3.5 with base 10.

Summary:

In this article, we discussed the definition, formula, and method to calculate the antilog of the numbers. To understand the idea of antilog solved different examples and solved it with a detailed explanation. I hope with the reading of this article you can solve the related problem easily.

