

Calculate the Value of Log Operations Problems - Guided Lesson Explanation

We will be using the following properties in all of the given cases:

$$\log_b(x^n) = n \log_b x$$

&

$$\log_b x + \log_b x = 2 \log_b x \quad \text{for the same arguments \& bases.}$$

You can then verify the answers by calculating the values directly using the property:

$$\log_x a + \log_x b = \log_x a * b \quad \text{and then calculating its logarithm value.}$$

Explanation #1

Applying the above properties to our problem:

$$\begin{aligned} \log_2 256 + \log_2 2048 &= \log_2 2^8 + \log_2 2^{11} \\ &= 8 \log_2 2 + 11 \log_2 2 \\ &= 19 \log_2 2 \\ &= 19 \end{aligned}$$

You can verify the answer by calculating directly:

$$\begin{aligned} \log_2 256 + \log_2 2048 &= \log_2 256 * 2048 \\ &= \log_2 524288 \\ &= 19 \end{aligned}$$

Explanation #2

Applying the above properties to our problem:

$$\begin{aligned} \log_2 1024 + \log_2 64 &= \log_2 2^{10} + \log_2 2^6 \\ &= 10 \log_2 2 + 6 \log_2 2 \\ &= 16 \log_2 2 \\ &= 16 \end{aligned}$$



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Explanation #3

Applying the above properties to our problem:

$$\begin{aligned}\log_2 4096 + \log_2 128 &= \log_2 2^{12} + \log_2 2^7 \\ &= 12 \log_2 2 + 7 \log_2 2 \\ &= 19 \log_2 2 \\ &= 19\end{aligned}$$

