MATHEMATICS · GRADES 10-12

Common logarithms

Difficulty level: Advanced

Mathematics: Grades 10-12

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Overview of the concept

This is how you work with base ten logarithms, the kind your calculator gives with the log button. Scientists use them to measure things like earthquake strength and sound loudness, because those quantities span such huge ranges that ordinary numbers are hard to compare. A logarithm squeezes that huge range into a scale you can actually work with.



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Worked examples

EXAMPLE 1

Q Evaluate log(100)

SOLUTION

A common logarithm has base 10, even when the base is not written.

Ask: 10 to what power equals 100?

$10^2 = 100$, so $\log(100) = 2$

EXAMPLE 2

Q Evaluate log(1000)

SOLUTION

A common logarithm has base 10.

Ask: 10 to what power equals 1000?

$10^3 = 1000$, so $\log(1000) = 3$

Practice questions

1 **What is log(10)?**

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2 **If log(x) = 4, what is x?**

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3 **What is log(1)?**

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4 **What is log(0.1)?**

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5 What is $\log(10^6)$?

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6 What is $\log(10) + \log(100)$?

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7 What is $\log(1000) - \log(100)$?

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8 **What is log(100) × 2?**

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9 **What is log(100000) divided by log(100)?**

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10 **What is log(1000) - log(100) + log(10)?**

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ANSWER KEY

1. 1

2. 10000

3. 0

4. -1

5. 6

6. 3

7. 1

8. 4

9. 2.5

10. 2

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