Questions: Logarithms

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Summary

A selection of questions for the study guide on logarithms.

Before attempting these questions, it is highly recommended that you read Guide: Introduction to Logarithms.

Q1

For the following, find the value of x, representing your answer exactly (not decimals).

- 1.1. $\log_7(x) = 1$
- 1.2. $\log_8(x) = 3$
- 1.3. $\log_{12}(x) = 0$
- 1.4. $\log_{10}(100) = x$
- 1.5. $\log_2(64) = x$
- 1.6. $\log_4(2) = x$
- 1.7. $\log_3(27) = x$
- 1.8. $\log_{10}(1) = x$
- 1.9. $\log_x(16) = 4$
- 1.10. $\log_x(49) = 2$
- 1.11. $\log_x(13) = 4$
- 1.12. $\log_{2x}(12) = -1$

Q2

Before attempting this question, write out the five laws of logarithms next to their names: the product rule, the quotient rule, the power rule, the zero rule, the identity rule.

Using the five laws of logarithms, find the value of x:

2.1.
$$\log_3\left(\frac{1}{27}\right) = x$$

$$\begin{array}{ll} 2.2. & 4 \log_4(2) = x \\ \\ 2.3. & \log_5(10) + \log_5\left(\frac{5}{2}\right) = x \\ \\ 2.4. & 3 \log_7\left(a^{1/3}\right) - \frac{1}{2} \log_7(a^2) = x \\ \\ 2.5. & \log_x(YZ) = M \\ \\ 2.6. & \log_a\left(y\right) - \log_a(x) = 11 \end{array}$$

Q3

Using the change of base rule and other laws of logs if required, express the following logarithms as expressions involving a logarithm to the specified base. Give your answer as simply as possible, evaluating if you can.

- 3.1. $\log_3(25)$ to base 5
- 3.2. $\log_8(3)$ to base 16
- 3.3. $\log_e(10)$ to base 1000
- 3.4. $\ln(27)$ to base 3
- 3.5. $\log_4(8x)$ to base 2

After attempting the questions above, please click this link to find the answers.

Version history and licensing

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• v1.1: edited 05/24 by tdhc.

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