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

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. $\log_a(y) - \log_a(x) = 11$

## 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 $2$

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

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