Introduction to Logarithms: Questions

Zoe Gemmell

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 if x is a rational number:

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. $\log_2(17) = x$

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 5 laws next to their names:
1. The Product Rule:
2. The Quotient Rule:
3. The Power Rule:
4. The Zero Rule:
5. The Identity Rule:

For the following, using the 5 Laws, find the value of x :
2.1. $\log_3\left(\frac{1}{27}\right) = x$

2.2. $\log_4(16) = x$

2.3. $\log_7\left(\frac{2}{49}\right) = x$

2.4. $\log_x(YZ) = M$

2.5. $\log_6\left(\frac{36}{x}\right) = 1$

2.6. $\log_5(25) = x$

Q3

Convert the following logarithms to the given base and evaluate

3.1. $\log_3(25)$ to base 5

3.2. $\log_4(64)$ to base 16

3.3. $\log_e(100)$ to base 10

3.4. $\ln(27)$ to base 3

3.5. $\log_4(8)$ to base 2

Q4

For the following, find the value of x:

4.1. $3^{x+1} = 7^x$

4.2. $17^{2x} = 4^{x-1}$

4.3. $5^{x+1} + 5^x = 12$

4.4. $2^{3x-1} = 10^x$

4.5. $11^x = 122^{(x-1)}$

4.6. $2^{2x} - 8 \cdot 2^x - 16 = 0$
