

Mathematics Handout - Logarithmics

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Introduction

Exp is continuous

$$x^l = A \Rightarrow \log_x A = l$$

$$x^m = B \Rightarrow \log_x B = m$$

$$x^n = A * B \Rightarrow \log_x(A * B) = n$$

$$x^n = x^l * x^m$$

$$x^n = x^{(l+m)}$$

Given that power is bijective and onto *

$$n = l + m$$

$$\log_x(A * B) = \log_x A + \log_x B$$

Logarithm Division Rule

$$x^l = A \Rightarrow \log_x A = l$$

$$x^m = B \Rightarrow \log_x B = m$$

$$x^n = A/B \Rightarrow \log_x(A/B) = n$$

$$x^n = (x^l)/(x^m)$$

$$x^n = x^l * x^{(-m)}$$

Given that power is bijective and onto *

$$n = l - m$$

$$\log_x(A/B) = \log_x A - \log_x B$$

Logarithm Division Rule

$$\log_x A = B \Rightarrow x^B = A$$

First multiply the left side for c

$$C * (\log_x A) = C * B$$

Now raise the right side to C

$$(x^B)^C = A^C$$

Given the Power rule

$$x^{(B * C)} = A^C$$

We can write this expression as log as

$$\log_x(A^C) = B * C$$

Which give use

$$\log_x(A^C) = C * (\log_x A)$$