Math 103 Day 23: Logarithmic Functions and their Derivatives

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Thursday December 2, 2010

Outline

Properties of Logarithmic Functions

1. If $a > 1$ and $x, y > 0$, then $log_a(xy) = log_a(x) + log_a(y)$.
2. If $a > 1$ and $x, y > 0$, then $log_a(\frac{x}{y}) = log_a(x) - log_a(y)$.
3. If $a > 1$ and $x, y > 0$, then $log_a(x^r) = (r)(log_a(x))$.
4. If $a > 1$, then $lim_{x \to \infty} log_a(x) = \infty$ and $lim_{x \to 0^+} log_a(x) = -\infty$

Change of Base Formula

For any positive number a ($a \neq 0$), we have

$$log_a(x) = \frac{ln(x)}{ln(a)}$$