

EXPONENT AND LOG RULES

Exponent Laws

- $x^0 = 1$
- $x^{-b} = \frac{1}{x^b}$
- $x^{a+b} = x^a x^b$
- $x^{a-b} = \frac{x^a}{x^b}$
- $(xy)^a = x^a y^a$
- $(x^a)^b = x^{ab}$
- **WARNING:** it is generally **not** the case that

$$(x + y)^a = x^a + y^a$$

Logarithm Laws

- $\log_a(1) = 0$
- $\log_a(xy) = \log_a(x) + \log_a(y)$
- $\log_a\left(\frac{x}{y}\right) = \log_a(x) - \log_a(y)$
- $\log_a(x^k) = k \log_a(x)$
- **WARNING:** it is generally **not** the case that

$$\log_a(x + y) = \log_a(x) + \log_a(y)$$