$\neg (f(n) = O(g(n))) \leftrightarrow$

$\neg (\exists c>0, n_0>0, \text{ s.t. } f(n) \leq c g(n) \ \forall n \geq n_0)$

$\forall c>0, n_0>0, \ \neg (f(n) \leq c g(n)) \ \exists n \geq n_0$

$f(n) > c g(n)$

$n \lg n \neq O(n)$

$f(n) = n \lg n$

$g(n) = n$

$\forall c>0, n_0>0,$ ~~$n \lg n > cn$~~ ~~$\geq cn$~~ $\exists n \geq n_0$

$\lg n > c$

$n = 2^c$

Log properties

$y = 2^x \leftrightarrow x = \lg y$

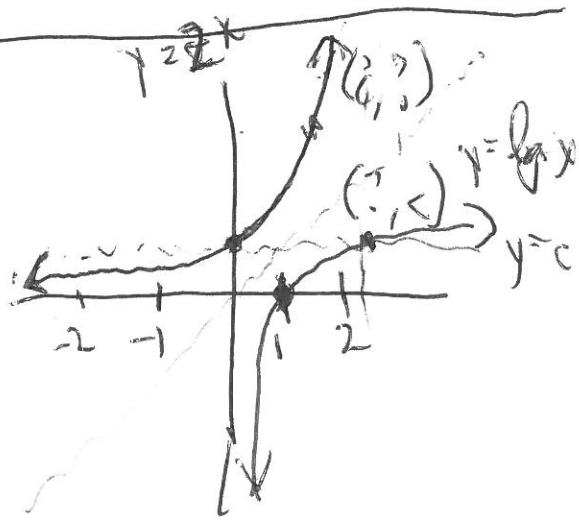
$y = e^x \leftrightarrow x = \ln y$

$2^a \cdot 2^b = 2^{a+b}$

$\log(ab) = \log a + \log b$

$(2^a)^b = 2^{ab}$

$\log(a^b) = b \log a$



$$\log_3 10 = \frac{\ln 10}{\ln 3}$$

$$\log_b a = \frac{\ln a}{\ln b} = \frac{\lg a}{\lg b}$$

$y = \ln x$ vs. $y = \log_3 x$

$$y = \frac{1}{\ln 3} \cdot \ln x$$